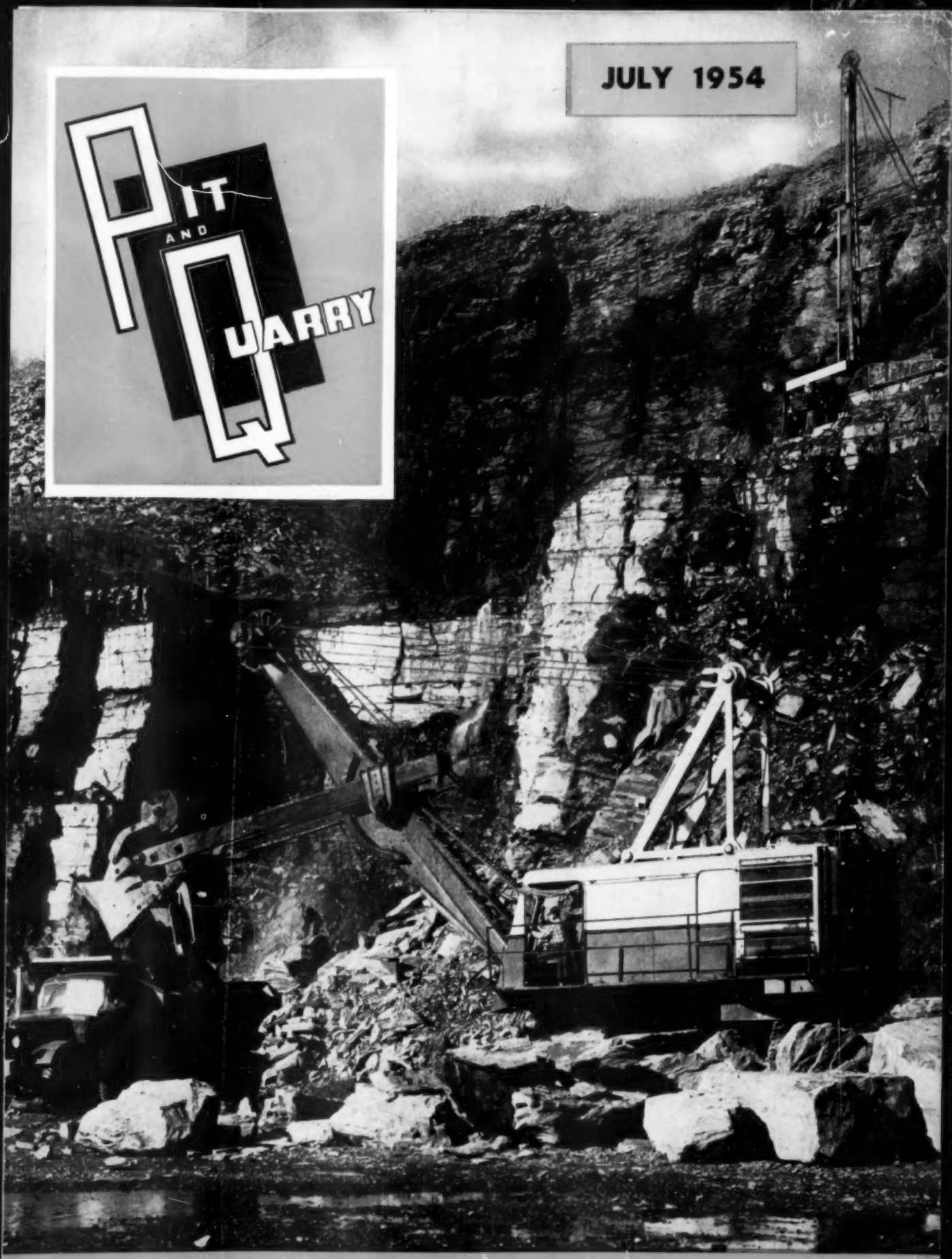
PIT AND QUARRY

JULY 1954



View in Quarry of Hercules Cement Corporation, Stockertown, Pa. (See Page 76.)

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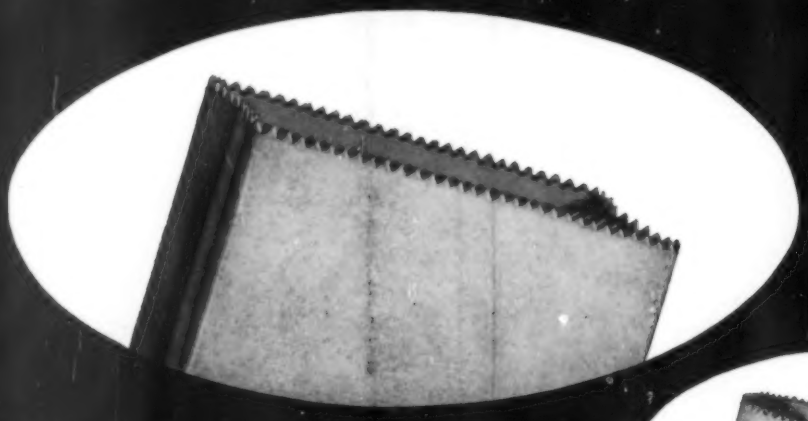
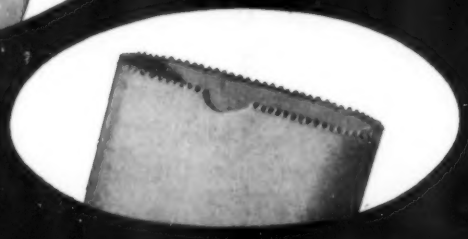
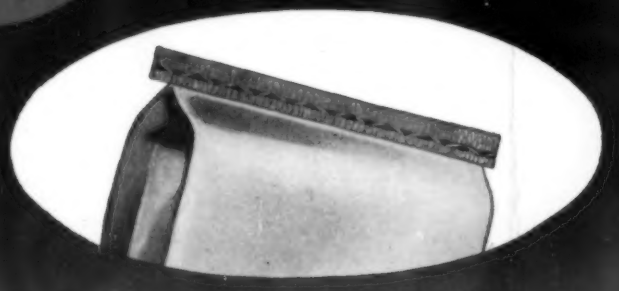
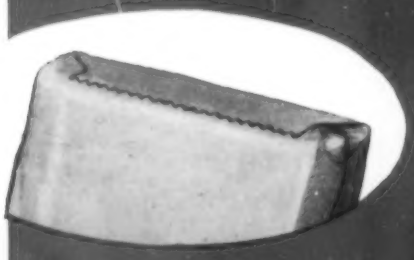


if it can be bagged...



BAGPAK *will bag it better!*





Here are just some of the advantages Bagpak Multiwall Bags give you and your customers.

• Lower packaging costs • Reduced freight costs • Better stacking of filled bags • Both filled and empty bags require less storage space • Shipping and storage on Bagpak Disposable Pallets cut unloading costs • Maximum protection against sifting, contamination, infestation, dampness • Full measure always emptied • Minimum dust hazard • Advertising message can be printed on face of bags

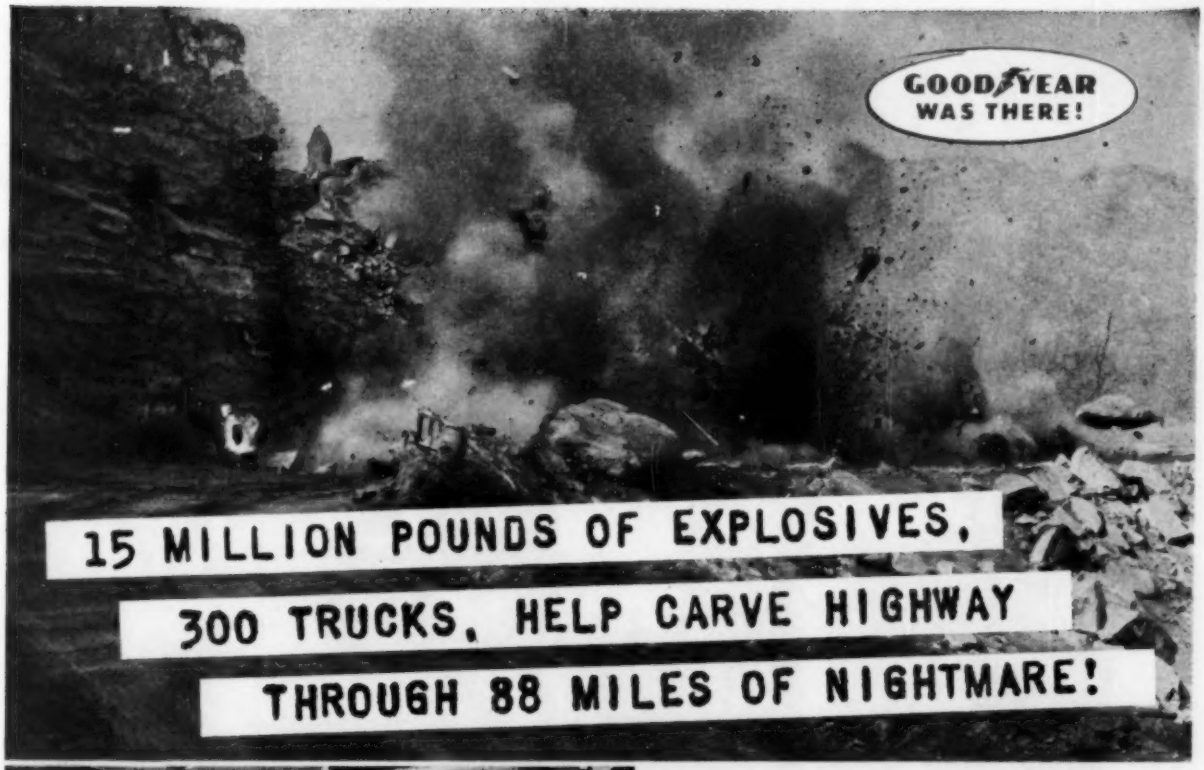
Bagpak production and quality are backed by the tremendous countrywide facilities and resources of the International Paper Company. For complete information and suggestions as to how you can package and ship your product more profitably, write:

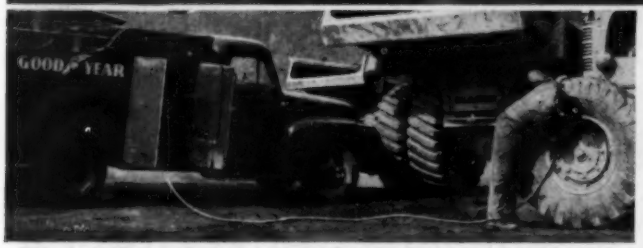
Dept. Q-20, Bagpak Division, 220 East 42nd Street, New York 17

International Paper COMPANY

BAGPAK DIVISION

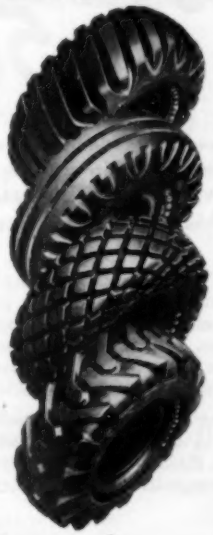
SALES OFFICES: Atlanta · Baltimore · Boston · Buffalo · Chicago · Cleveland · Dallas · Denver · Detroit · Kansas City, Kansas · Los Angeles · Louisville · Milwaukee · New Orleans · Philadelphia · Pittsburgh · St. Louis · San Francisco · IN CANADA: The Continental Paper Products, Ltd., Montreal, Ottawa, Toronto





SERVICE TRUCKS, right on the firing line, provide on-spot airing and tire inspection.

Our Nation's Newest Super-Road—the West Virginia Turnpike — cuts, fills, bridges, dams and tunnels its way through worse mountain terrain than most contractors have ever tackled. The 88 miles from Charleston to Princeton are 60% solid sandstone and the rest is "largely landslides!" Even Hercules would doff his helmet to the men and machines that are wrapping this one up in less than 15 months!



No Tougher Test for men or equipment. No surer place to prove the rugged endurance, the superior working qualities of Goodyear off-road and earth-mover tires.

And Today's 3-T Cord Tires are by far the most enduring that Goodyear has ever produced! Goodyear's new and exclusive 3-T process keeps Nylon or Rayon cord at its most bruise-resistant, heat-resistant point, controls tire growth, reduces cracking, tread and body failures to new LOWS. Combined with the toughest tread-stocks yet developed, 3-T Cord is one more big reason why you'll find that Goodyear is there—*all* there—on the toughest jobs you'll ever tackle! Goodyear, Truck Tire Dept., Akron 16, Ohio.

And Remember
NOTHING ELSE TAKES IT LIKE 3-T NYLON

FOR EACH JOB, THERE'S A COST-CUTTING GOODYEAR TIRE!

GOODYEAR

MORE TONS ARE HAULED ON GOODYEAR TRUCK TIRES THAN ON ANY OTHER KIND

Sure-Grip, All-Weather—T. M.'s The Goodyear Tire & Rubber Company, Akron, Ohio

PIT AND QUARRY, July, 1954, Vol. 47, No. 1. Published monthly by Pit and Quarry Publications, Inc., 431 South Dearborn St., Chicago 5, Ill. Subscription price $3 for 1 year in the U. S. and possessions, Canada, Central and South America; elsewhere $3 additional for each year. Single copy $1.00. Entered as second-class matter February 28, 1932, at the Post Office at Chicago, Ill., under the Act of March 3, 1879. Postmaster: please send notices on Form 3578 and copies returned under label Form 3579 to 431 South Dearborn Street, Chicago 5, Ill.

NEW—side-dumping SHOVELOADER cuts loading time up to 50%!

This new side-dumping SHOVELOADER offers definite advantages over straight front-end loaders on many applications:

1. **Loading time is cut as much as 50%. Trucks need not be backed into exact position—loader fills truck from rear or sides without turning.**
2. **It can operate in congested areas, where backing and turning for loading or stockpiling are not possible.**
3. **Clutch life is doubled. Two less clutching operations are required for the pick-up, discharge cycle.**
4. **Funnel-like discharge from end of bucket (see inset) means greater precision in load placement—eliminating spillage and clean-up work.**
5. **Snow removal and "windrow" operations are speeded and equipment life increased by straight line travel, front pick-up and side discharge.**
6. **Operates like conventional front-end loader when desired.**

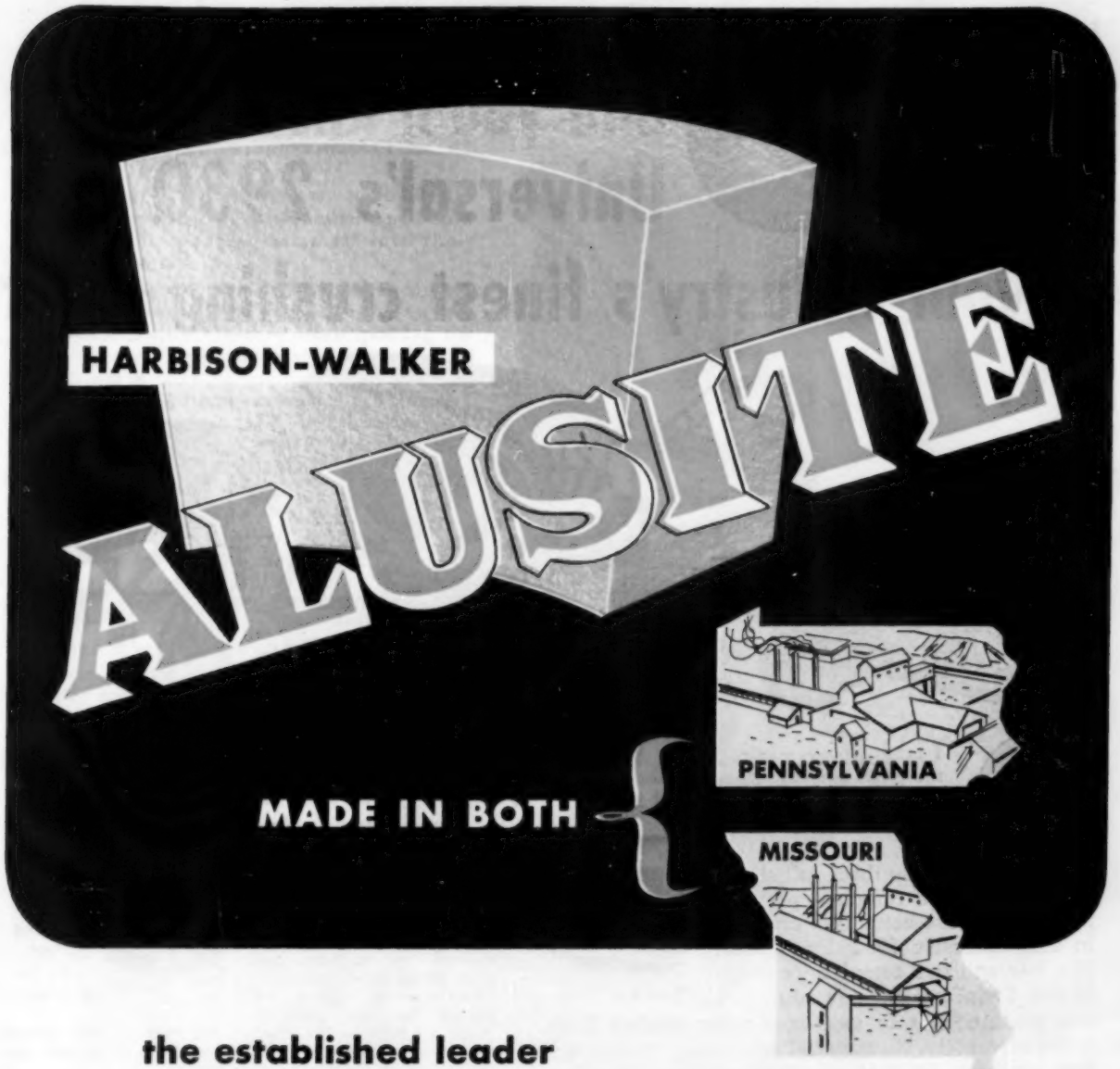
Selection of side or front dumping is made from operator's position. Bucket tips to side by hydraulic action, and end plate starts to open immediately by lever linkage, with speed of opening increasing as angle of tilt increases. End closes automatically as bucket returns to horizontal position.

Side-dumping SHOVELOADER attachments are available in ¾ and 1¼ cu. yd. bucket sizes. Write for further information. BAKER-LULL Corporation, 356 West 90th Street, Minneapolis 20, Minnesota.

Baker Lull

handling equipment

SHOVELOADER®



the established leader in the 70% alumina refractory class

The superior physical properties and chemical composition of ALUSITE long ago established its leadership in the 70% Alumina Refractory Class.

Outstanding service records made by ALUSITE in rotary kilns are attributable to its low porosity, high strength, volume stability and excellent spalling and flux resistance.

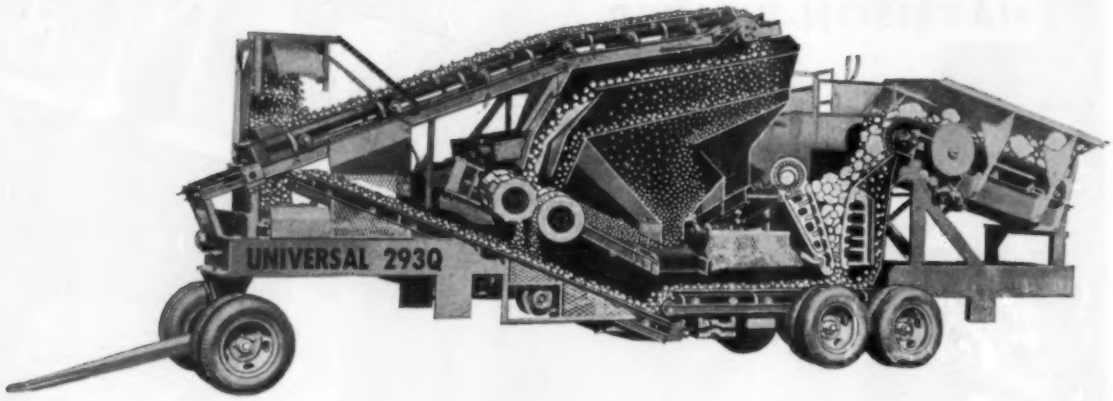
Some highly economical applications of ALUSITE are the following:

- **High temperature zones of cement kilns**
- **Transition zones of basic-brick-lined cement, magnesite and dolomite kilns**
- **Calcining zones of lime, lime-sludge, magnesite and dolomite kilns**

Included in Harbison-Walker products are refractories for every rotary kiln plant requirement.

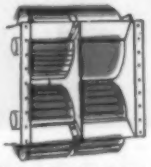
Harbison-Walker Refractories Company
AND SUBSIDIARIES
WORLD'S LARGEST PRODUCER OF REFRACTORIES
General Offices . . . . . Pittsburgh 22, Pennsylvania

take 45 seconds to read this and you'll know why Universal's 293Q is your industry's finest crushing plant



Universal 293Q TwinDual Pacemaker — two plants in one. Requires only one operator. For top capacity in rock and gravel. Completely portable.

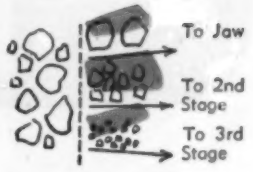
Universal gives you three full stages of crushing in a complete portable plant. There are actually 3 crushers in this exclusive 293Q Pacemaker. The jaw and two complete crushers in the TwinDual rolls (4 rolls — 2 sets mounted side by side on common shafts). Each is fed separately. No material enters any crusher unless crushing by that stage is required; in other words, a closed circuit after each crushing operation.



TwinDual Rolls

What this means! With 2 stages of reduction in the TwinDual roll crusher, the jaw is no longer a bottleneck . . . the discharge opening can be set up to 100% wider. Production is greatly increased — less jaw and roll wear — longer crusher life — less maintenance . . . because no crusher is burdened with over or undersize material.

9 big reasons why the 293Q is your industry's finest plant



1. TwinDual rolls permit up to 7 to 1 reduction ratio with 80% increase in capacity over a conventional roll crusher.
2. High roll reduction ratio doubles jaw capacity and gives better angle of nip.
3. Three separate stages of reduction in one portable plant; 1st stage — jaw crusher. 2nd stage — wide opening section of TwinDual roll crusher. 3rd stage — narrow opening section of TwinDual roll crusher.
4. High percentage of finish produced in each stage. 26% of material from jaw is finished and never enters another crushing stage. 53% of finish from second stage and 85% finish from third stage. Only 15% is again recirculated for crushing.
5. Here's the plant for rock or gravel. Large feed opening jaw handles large boulders in gravel pits.
6. Skid mounted jaw and feeder permits plant to meet highway weight limitations. Easy to move.
7. Only one plant to move. One power unit to service.
8. Feeder interchangeable with scalper screen for gravel operation.
9. Operators report up to 200 T.P.H. with 100% crush and 300 T.P.H. and over in gravel with 25% crush.

This is only part of the 293Q story. This plant is loaded with profit-making features to help you beat competition. Get the facts from your Universal distributor or write to Universal Engineering Corporation.

PETTIBONE UNIVERSAL
In Cedar Rapids, Iowa since 1906

UNIVERSAL ENGINEERING CORP.
619 C Avenue N.W., Cedar Rapids, Iowa
Subsidiary of Pettibone Mulliken Corp., 4700 W. Division St., Chicago 51, Illinois

There is nothing Snappier with a Clam!

No. 8 for Rieth-Riley Construction Co.
Goshen — South Bend
Indiana

● Here is No. 8 Northwest owned by Rieth-Riley Construction Co. of Goshen and South Bend, Ind., pouring material into their asphalt plant.

With Northwest equipment it's easy to keep ahead of the plant. Northwest Uniform Pressure Swing Clutches make spotting the load easier. They eliminate the jerks and grabs that set a load to swinging. Northwest Crawlers make maneuvering and changing position with the load easier. The "Feather-Touch" Clutch Control gives ease of operation without the complications of valves, pumps and tubing. There are no delays occasioned by waiting for special experience to care for intricate adjustments.

Smooth, easy convertibility that results in operation and performance over and above a mere change of booms, means increased output whether converting to a Shovel, a Dragline or a Pullshovel.

These are some of the reasons why Rieth-Riley and other well-known contractors buy Northwests over and over again.
Let us tell you more about them.

NORTHWEST ENGINEERING CO.
135 South LaSalle Street,
Chicago 3, Illinois

NORTHWEST

SHOVELS • CRANES • DRAGLINES • PULLSHOVELS

Convertible for any Mining Material Handling or Excavation Problem

if you want lower V-Belt costs—

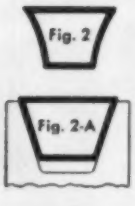
When a V-Belt bends, you can feel its sides change shape.

just make this simple test

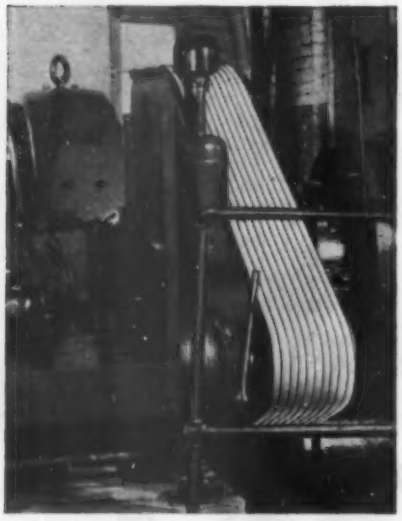
Take *any* V-belt that has *straight* sides (Fig. 1). Bend that V-belt while you grip its sides with your fingers. You will *feel* the sides *bulge out* (Fig. 1-A). Clearly, that out-bulge forces the belt to press *unevenly* against the V-pulley—and this *concentrates* wear at the points shown by arrows (Fig. 1-A).

Now bend a Gates Vulco Rope with CONCAVE SIDES (Fig. 2)

(U.S. PAT. NO. 1813698)



Instead of *bulging*, the precisely engineered CONCAVE SIDES merely *fill out* and become perfectly straight. This belt, when bent, *precisely fits* its sheave groove (Fig. 2-A). The sides of the Gates Vulco Rope press *evenly* against the V-pulley. Therefore, wear is distributed *uniformly* across the *full face* of this belt—resulting in *longer* belt life and *lower* belt *costs* for you!



Typical Gates Vulco Rope Drive—the Gates V-Belts are built with Concave Sides to insure longer belt wear.

When you buy V-belts, be sure to get the V-belt with the Concave Sides—the Gates Vulco Rope!

Gates VULCO ROPE DRIVES

REG. U.S. PAT. OFF.

Gates Engineering Offices and Jobber Stocks are located in all industrial centers of the United States and Canada, and in 70 other countries throughout the world.

THE GATES RUBBER COMPANY
DENVER, U.S.A.

CS-543

Built to take it

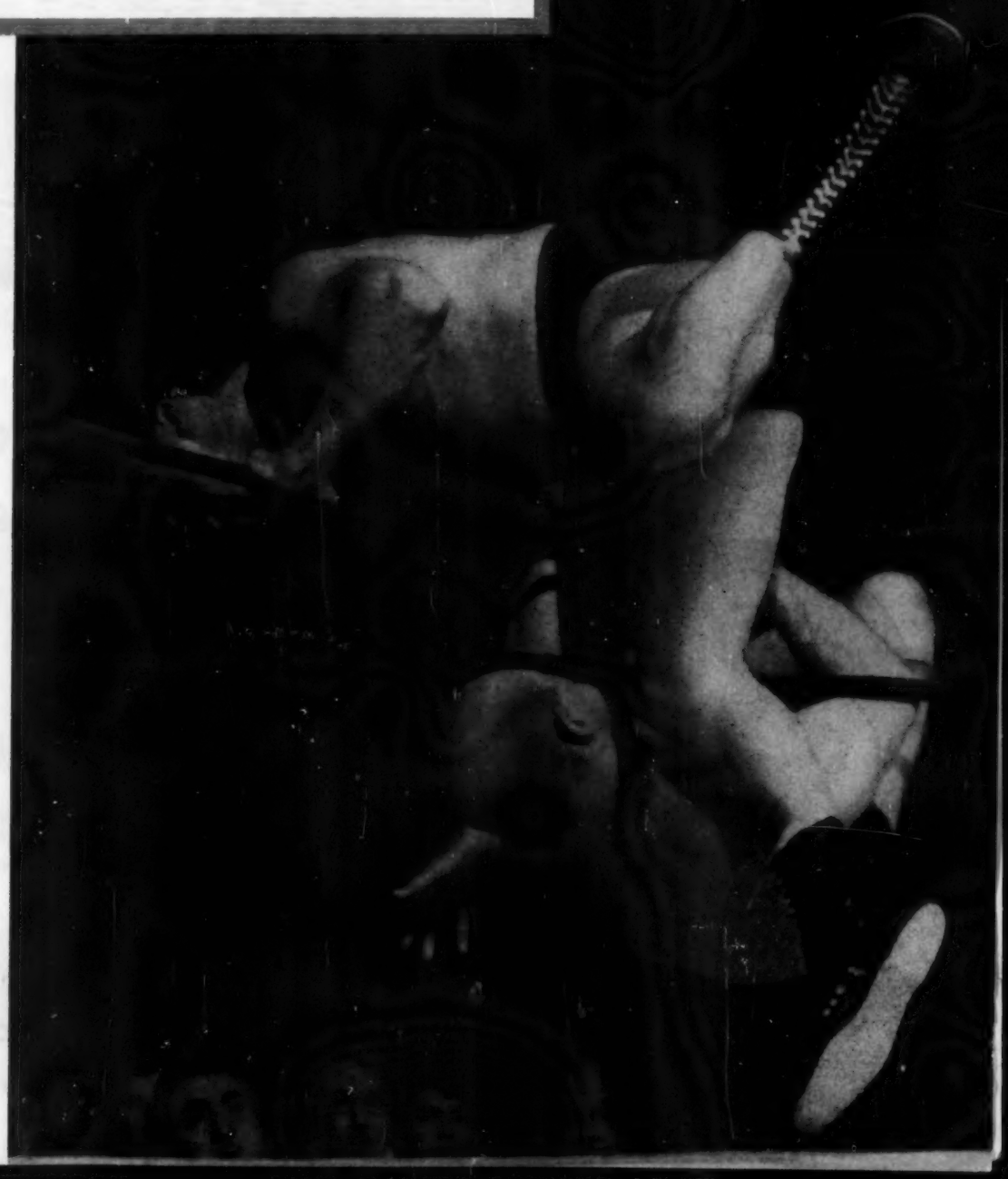
You have to contend with rough handling in shipping every day. Union Multiwall Bags have the built-in toughness to take constant bouncing and jouncing. They are made from heavy-duty Kraft we manufacture ourselves and are engineered to the exact needs of your own production and shipping departments.

UNION MULTIWALL BAGS

UNION BAG & PAPER CORPORATION

Woolworth Building, New York 7, N. Y.

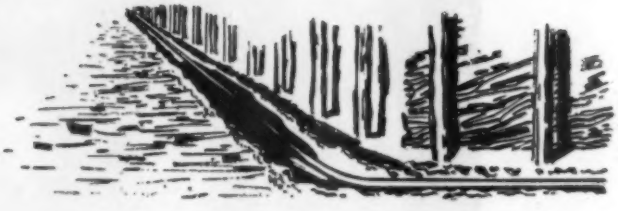
TRADE MARK UNION



Expose it to sun and heat...

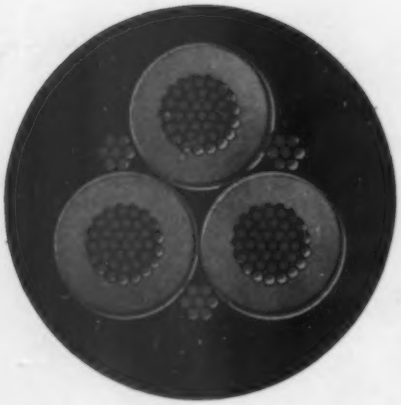
Pull it over rocks and shale...

Trench it in presence of acid water...



Through it all—

Anaconda's tough **MINE POWER CABLE** keeps power flowing



This easy-to-splice cable is built for heavy duty. It saves you money. It handles well. And it lasts longer – with fewer power interruptions, less maintenance trouble.

Here's why:

BUTYL INSULATION has high dielectric strength . . . superior long-aging characteristics . . . and excellent resistance to moisture, ozone, and heat.

NEOPRENE JACKET is tough . . . has real flexibility and great strength . . . and is resistant to flame and corrosive mine water.

See your nearest Anaconda Sales Office or Distributor for full information about this durable, low-cost Mine Power Cable. Do it today! *Anaconda Wire & Cable Company, 25 Broadway, New York 4, N. Y.*

5436

the right cable for the job

ANACONDA® **WIRE AND CABLE**

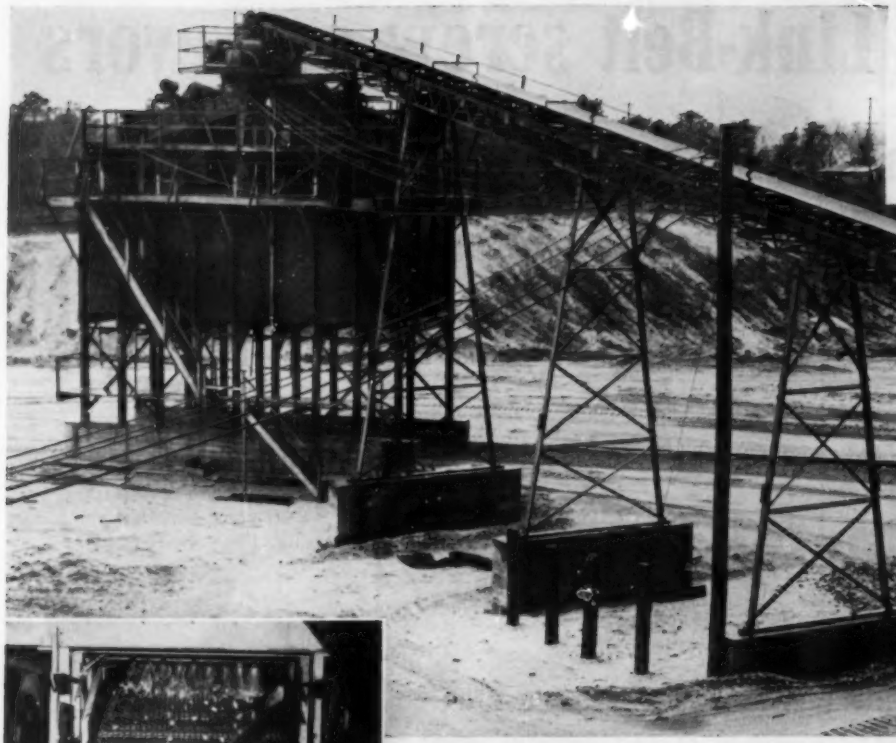
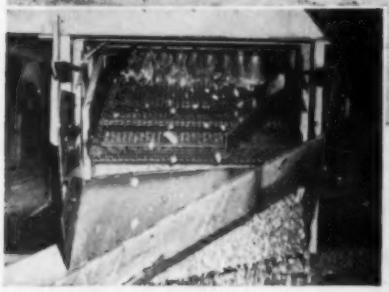
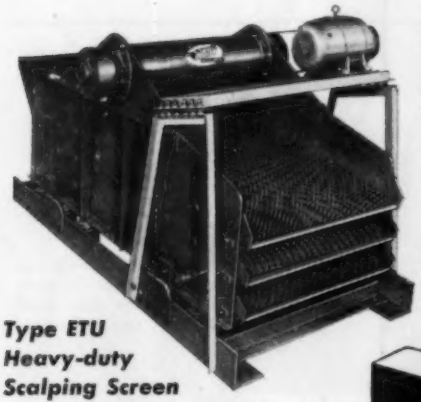


Photo showing newly expanded Plant 3 at Sand and Gravel Division of East Coast Lumber Terminal, Inc.—engineered and equipped for maximum efficiency and production. Note the 2 new Type ETU 5 x 10 single deck Deisters.



(Above) Average daily production of this Model ETU 3 deck, 5 x 10 Deister Screen is in excess of 1,500 tons. The screen sizes and washes grit, ¾" and 1½" sizes.

(Below) This Type ETU Heavy-Duty Scalping Screen, like all other Deister Screens, features opposed elliptical throw . . . vibration fully cushioned . . . low screening angle . . . operates in a bath of oil . . . automatic screen cloth tension . . . adjustable throw.



Type ETU Heavy-duty Scalping Screen

"3,500,000 Tons over this DEISTER

. . . maintenance averages less than $0.29 per 1,000 tons."

The Sand and Gravel Division of East Coast Lumber Terminal, Inc., Farmingdale, New York—major aggregate producer in central Long Island—is another typical "repeat-order" Deister customer. Based on the outstanding performance of two earlier Deister installations, they recently installed two more single-deck 5 x 10 Model ETU Deister screens in their latest expansion at Plant 3.

Mr. Virgil M. Price, President . . . satisfied with the performance of the original Deister screen, says: "The 5 x 10 triple-deck Deister has screened 3,500,000 tons of Bankrun feed, gravel content 44%, since installation and is still going strong after 8 years. Maintenance has been less than $1,000—not including screen cloth, of course."

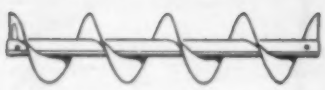
Specialists in the design, manufacture and installation of vibrating screens, the Deister Machine Company offers over 100 models to fit any screening problem. Standard screens come in a variety of 1, 2, and 3-deck types in sizes from 2¼ x 4 to 5 x 14. All screens can be furnished with the Deister Electric Screen Heater.

DEISTER

DEISTER MACHINE COMPANY

1933 EAST WAYNE STREET, FORT WAYNE 4, INDIANA

See why Link-Belt screw conveyors are 8 ways better



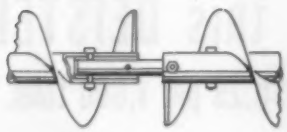
1. LOOK FOR UNIFORMITY OF PITCH

Specialized modern machinery assures accurate forming, producing uniform flighting curvature.

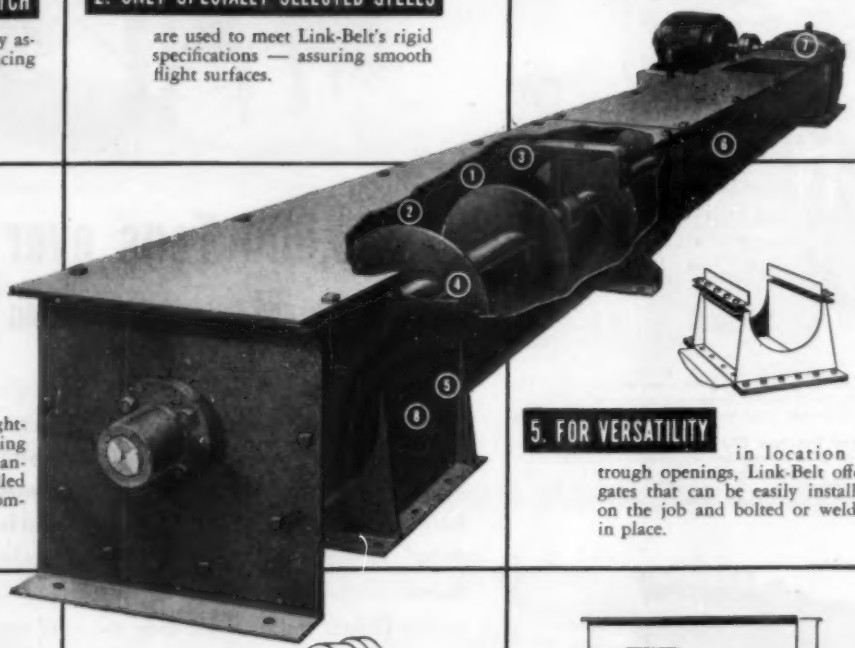
2. ONLY SPECIALLY SELECTED STEELS

are used to meet Link-Belt's rigid specifications — assuring smooth flight surfaces.

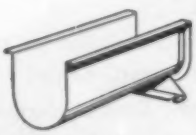
3. HERE'S A WIDE RANGE of hanger styles and mountings with various bearing materials.



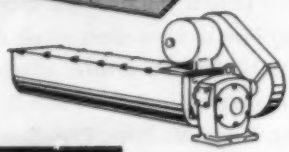
4. FOR YOUR PROTECTION straightness is checked before shipping and extra care is taken in handling and loading. Jig-drilled coupling bolt holes assure complete and easy assembly.



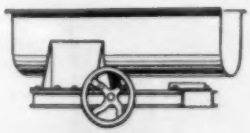
5. FOR VERSATILITY in location of trough openings, Link-Belt offers gates that can be easily installed on the job and bolted or welded in place.



6. YOU'LL DISCOVER that troughs are accurately fabricated to assure better fit of all components. Link-Belt offers a choice of metals to fit your particular application.



7. ONLY LINK-BELT builds a complete integrated line of gear and chain drives, couplings, bearings. One proved source . . . one undivided responsibility.



8. YOUR CHOICE of fixed or detachable plain discharge spouts or gates. Flat or curved slide type gates can be hand or rack-and-pinion operated.

LINK-BELT

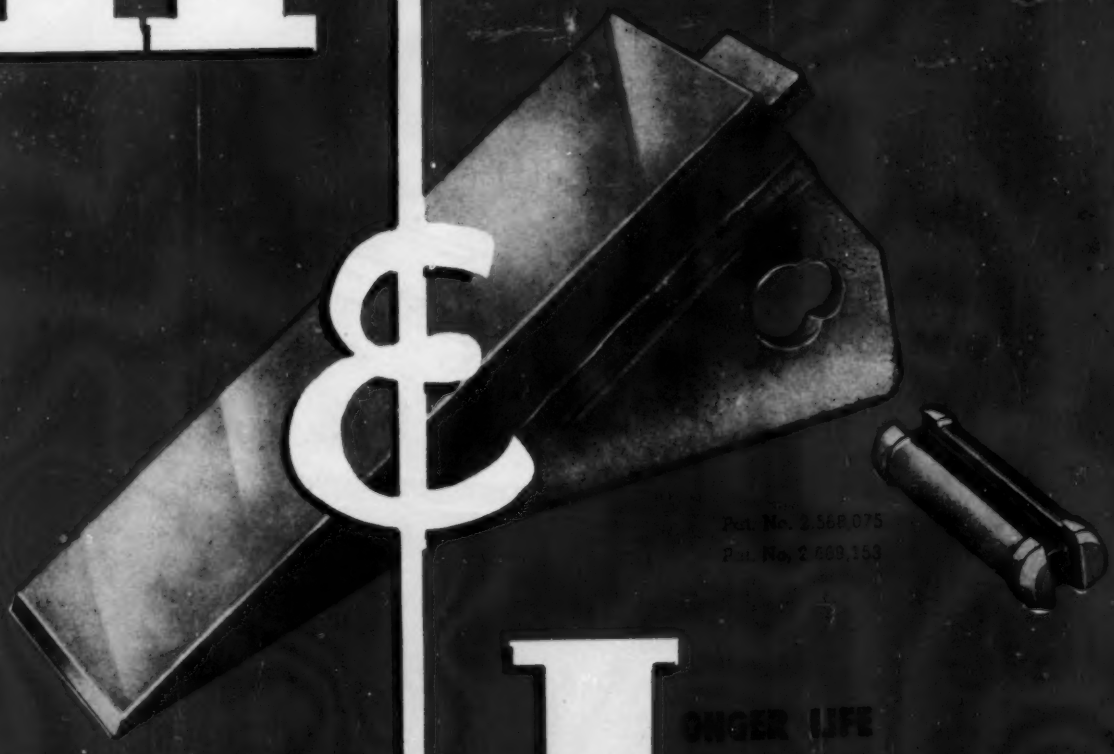
SCREW CONVEYORS

These are only a few of the many important differences in screw conveyors. Ask your Link-Belt sales representative or distributor for new 92-page Data Book 2289.

LINK-BELT COMPANY: Plants: Chicago, Indianapolis, Philadelphia, Colmar, Pa., Atlanta, Houston, Minneapolis, San Francisco, Los Angeles, Seattle; Scarboro, Toronto and Elmira, Ont. (Canada); Springs (South Africa); Sydney (Australia). Sales Offices, Factory Branch Stores and Distributors in Principal Cities. 13,276

H

IGH GRADE FORGED ALLOY
STEEL TO INSURE TOUGHNESS



Pat. No. 3,568,075
Pat. No. 2,669,153

&

L

ONGER LIFE
ESS POWER
OWER COST

Teeth that really dig

H & L TOOTH COMPANY

1540 SOUTH GREENWOOD AVE. MONTEBELLO, CALIFORNIA

KOEHRING COMPANY
Milwaukee 16, Wis.
Subsidiaries: JOHNSON
PARSONS · KWIK-MIX

BIG-PRODUCTION TEAM — Loading rock, Koehring 1½-yard shovel (above) is teamed up with Koehring Dumpsters.®

Measure excavators by

price per pound of lifting capacity

In analyzing shovel operation, you will find that price per pound of lifting capacity on crane rating is also an excellent measurement of excavator value.

Remember, lift capacity is *work capacity*. Obviously, the machine with the heaviest lift rating not only picks up larger crane loads — it also has more strength, extra speed and stability to handle bigger loads faster with every excavator attachment.

Check Koehring lift ratings shown below — then ask your Koehring distributor to give you the figures on price per pound of lifting capacity.

Compare for yourself:

KOEHRING MODEL	SIZE DIPPER	KOEHRING LIFT CAPACITIES (Crawler ratings based on 75% of tipping load. Rubber-tired machines — 85% of tipping load)		PRICE PER POUND OF LIFT CAP.*
205 CRAWLER	½-Yd.	20,000 lbs.	30-foot boom at 10-ft. radius	?
205 ON RUBBER	½-Yd.	30,000 lbs.	25-foot boom at 12-ft. radius	?
304 CRAWLER	¾-Yd.	27,800 lbs.	35-foot boom at 12-ft. radius	?
304 ON RUBBER	¾-Yd.	50,000 lbs.	30-foot boom at 10-ft. radius	?
405 CRAWLER	1-Yd.	40,000 lbs.	40-foot boom at 12-ft. radius	?
605 CRAWLER	1½-Yds.	72,300 lbs.	50-foot boom at 12-ft. radius	?
1005 CRAWLER	2½-Yds.	159,000 lbs.	50-foot boom at 12-ft. radius	?

*Figures available on request—ask your Koehring distributor to see them.

K4391

EIMCO

EIMCO TRACTOR-EXCAVATORS ON SLIM'S RIVER IN THE YUKON

Along the rocky shore line of Lake Kluane riprap is being loaded into big trucks by an Eimco 105. This is a race against time to beat the spring thaw.

The contract is for building a bridge and approaches to the Slim's River crossing on the Alaskan Highway which runs west from Whitehorse to the southern edge of Lake Kluane then northwest to Alaska.

Working off the frozen surface of the lake in temperatures 30° to 45° below zero the Eimco 105 loads single pieces weighing 6 to 7 tons

into the trucks. Many times one rock will be a full load.

The huge pieces are used on the upstream side of the fill particularly near the bridge to protect the new fill from damage when the spring thaw starts breaking the ice in Slim's river and the flow starts toward the lake piling ice in against the fill.

Eimco 105 was selected for the loading job because of its easy operation and maneuverability. The 105 could also load large pieces that would have required much more expensive equipment. In addition the 105 could dig out the rock which usually freezes as soon as it falls to the ground after being blasted.

When your job requires fast, low-cost loading in rock, sand gravel or other material your best selection is the Eimco 105. Write for information.

Big trucks are loaded wtih chunks weighing 6 to 7 tons. Sometimes one rock is a load.

893

THE EIMCO CORPORATION

Salt Lake City, Utah—U.S.A. • Export Offices: Eimco Bldg., 52 South St., New York City

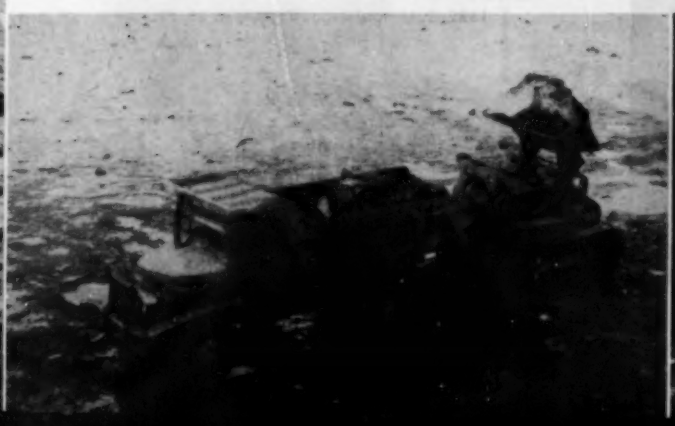
New York, N. Y. Chicago, Ill. San Francisco, Calif. El Paso, Texas Birmingham, Ala. Duluth, Minn. Kellogg, Ida. London, Eng. Paris, France Milan, Italy

(Above) Trucks are spotted and quickly loaded by Eimco 105 Tractor-Excavators. No time is lost shifting from forward to reverse or between speed changes on the 105.

(Above) Eimcos are easy to spot to the truck because one track can be run forward while the other is run reverse.

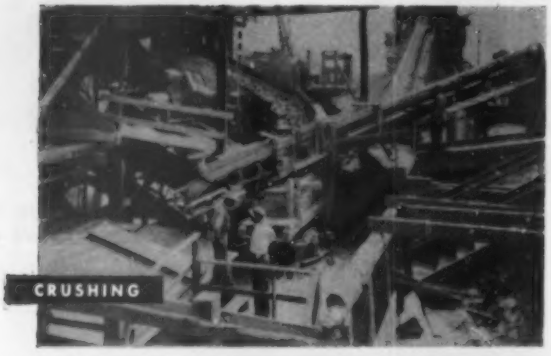
(Below) Large pieces can be loaded from the side or end of the truck. The large granite rock in the bucket weighs between five and six tons.

(Below) Digging in broken rock is easy for the 105. This machine is designed for rock digging and loading.



Here's a team that's hard to beat for trouble-free, economical operation;

Gulf Quality Lubricants and Fuels



Whatever your activity — whether it's quarrying, crushing, processing, or hauling —Gulf lubricants and fuels will help contribute to a smoother over-all operation with lower maintenance costs.

Use Gulf lubricating oils and greases to insure an extra margin of protection for every gear and bearing in your equipment. They will provide a tough and stable film that prevents excessive wear and cuts maintenance costs. Gulf motor oils help prevent the formation of rust, sludge, and varnish—engines use less oil and require fewer overhauls.

Gulf gasoline and Diesel fuel burn evenly and completely—insure full power and smooth engine performance.

And remember too that Gulf provides excellent engineering service to make sure that the most suitable lubricants and fuels are used for every unit and climatic condition.

Contact your nearest Gulf office today and let us discuss with you how Gulf products and fine service can help your operation.

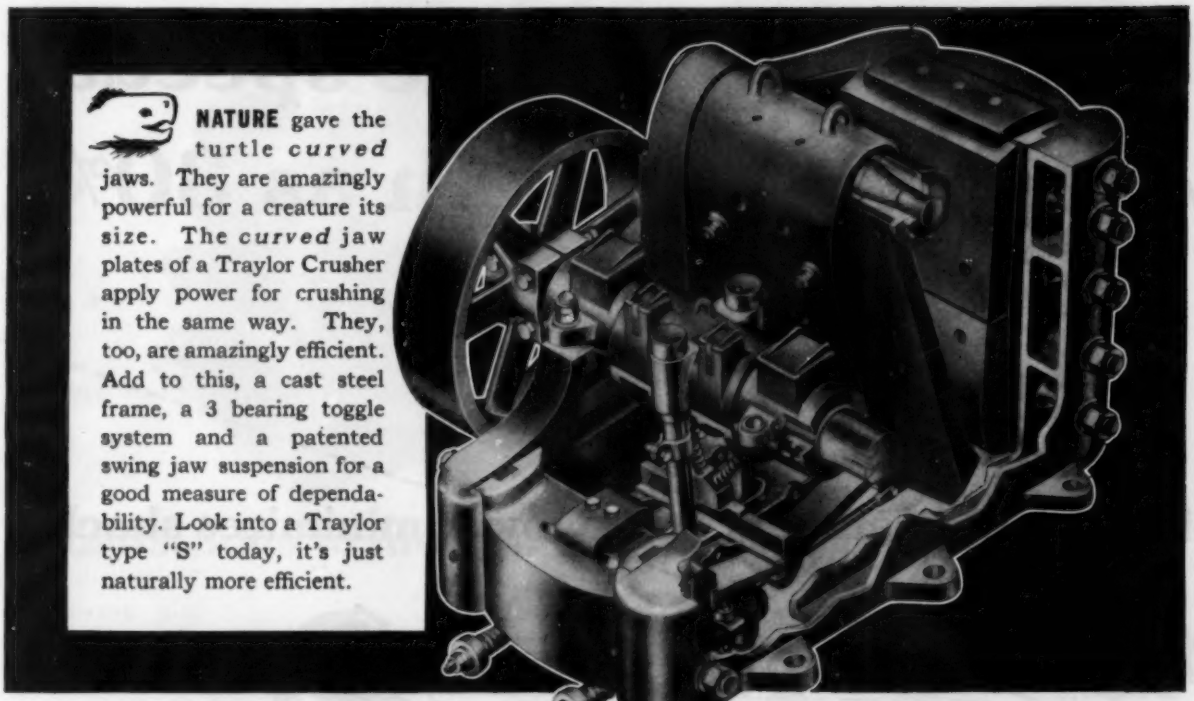
Gulf Oil Corporation · Gulf Refining Company

1822 GULF BUILDING, PITTSBURGH 30, PA.

GULF

efficiency

Comes "NATURAL" With a TRAYLOR "S" JAW CRUSHER

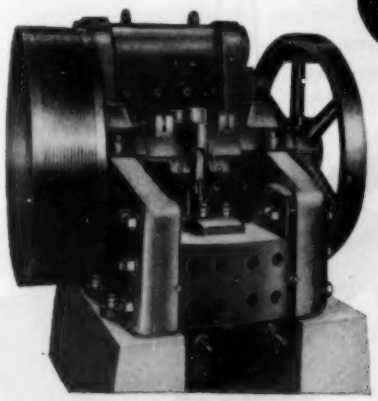


NATURE gave the turtle *curved* jaws. They are amazingly powerful for a creature its size. The *curved* jaw plates of a Traylor Crusher apply power for crushing in the same way. They, too, are amazingly efficient. Add to this, a cast steel frame, a 3 bearing toggle system and a patented swing jaw suspension for a good measure of dependability. Look into a Traylor type "S" today, it's just naturally more efficient.

7 sizes with feed openings from 36" x 42" to 60" x 84".

SEND FOR BULLETIN
that gives all the facts

A **Traylor** LEADS TO GREATER PROFITS



TRAYLOR ENG. & MFG. CO.
666 MILL ST., ALLENTOWN, PA.
Sales Offices: New York • Chicago • San Francisco
Canadian Mfrs: Canadian Vickers, Ltd., Montreal, P.Q.

NATURALLY I'm interested in knowing more about the production efficiency of the Traylor "S" Jaw Crusher.

*Name*_____

*Company*_____

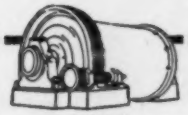
*Address*_____

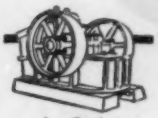
*I'm now crushing*_____*tons per hour with a*_____*crusher.*

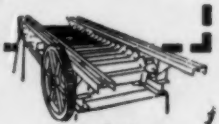
Primary Gyratory Crushers

Rotary Kilns

Secondary Gyratory Crushers

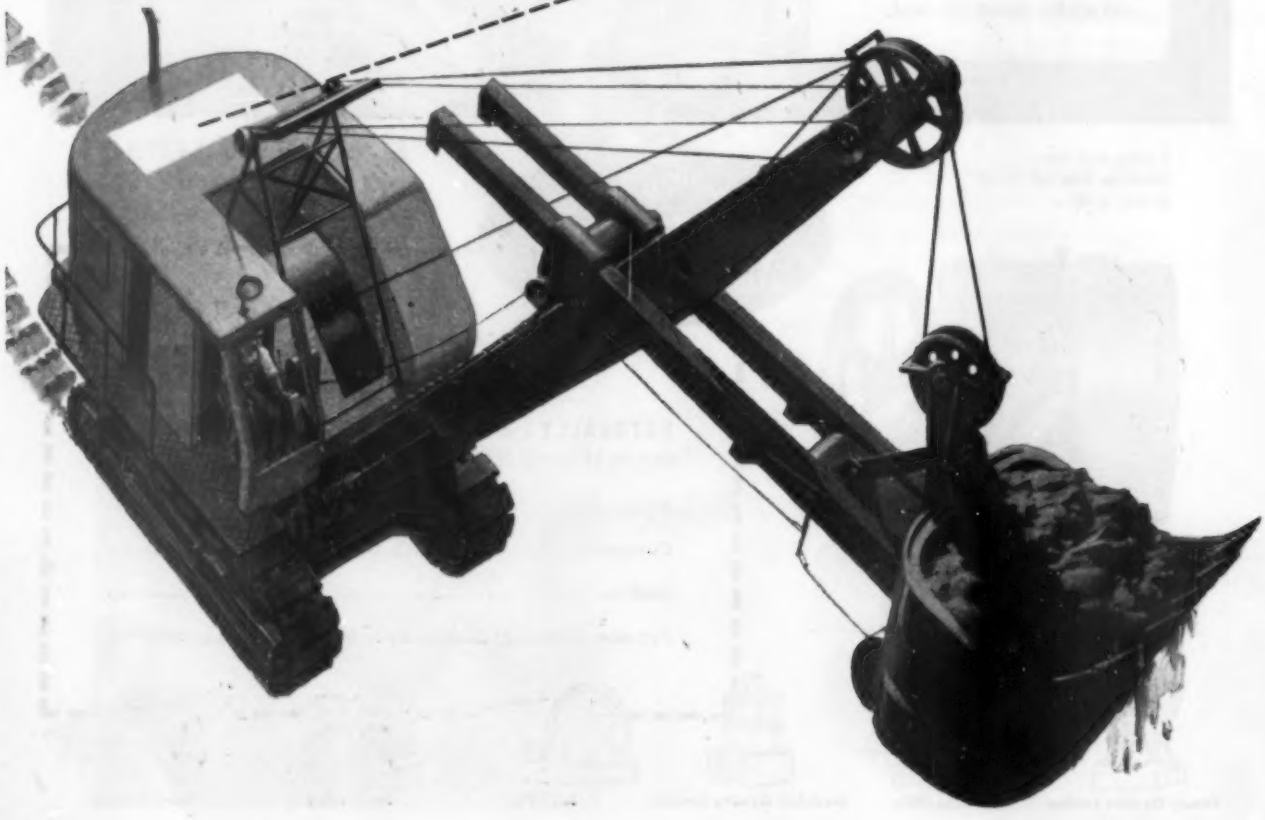

Ball Mills

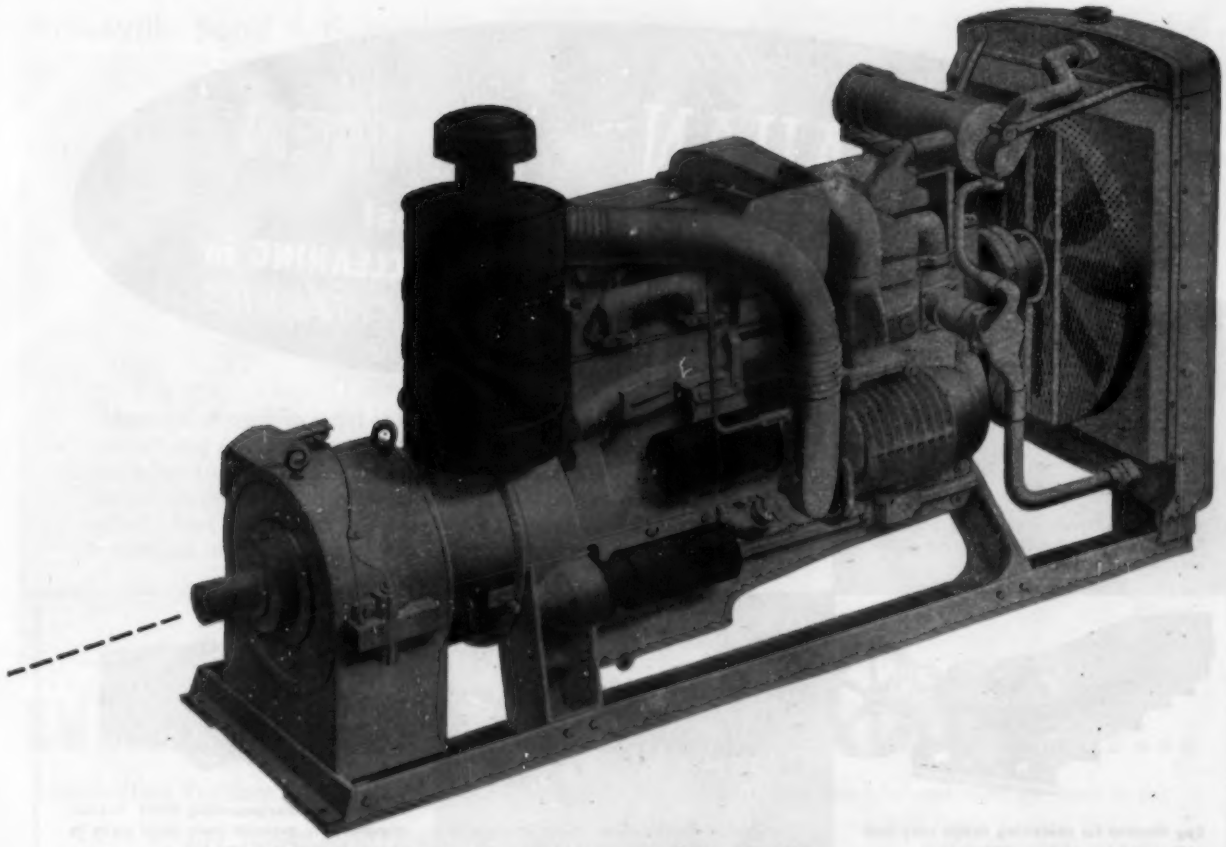

Jaw Crushers


Apron Feeders

Cummins Diesel - torque converter package speeds work cycle as much as 30%

Gives full utilization of horsepower, minimizes shock





loads, adds to life of shovels, cranes, and draglines

Cummins Torque Converter Packages give smooth steady power over the entire digging or working cycle. Even where digging is the toughest and power requirements fluctuate widely, the Cummins Torque Converter maintains power without lugging, stalling or overspeeding. Crane work, too, can be speeded because loads can be handled more smoothly and accurately.

The output of the Cummins Torque Converter Package is measured by an output shaft governor which determines the exact amount of power required each instant and automatically matches engine speed to load requirements. This increases work capacity, adds to equipment life, saves fuel and engine wear.

Cummins Diesels, ranging from 60 to 600 h.p., equipped with one of many types of torque converters, can match any job you have. Available as replacement units or in many makes of new equipment.

CUMMINS

Cummins Engine Company, Inc.
Columbus, Indiana

Rugged diesel power (60-600 h.p.)

Specify

McLANAHAN EQUIPMENT

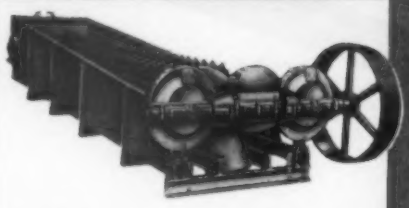
for dependable-low cost

FEEDING, CRUSHING, CLEANING in

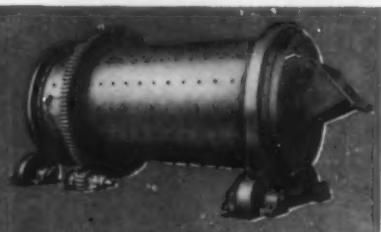
PITS, MINES and QUARRIES

All Steel Rockmaster Single Roll Crusher for primary or secondary work on shovel loaded rock and ore.

A pioneer in the development of many types of processing equipment, McLanahan has served domestic and foreign pits, mines and quarries for more than a century. Shown on this page are a few illustrations of McLanahan equipment for crushing, washing, sizing and conveying all types of ore, coal and rock. Technical details and price information will be sent upon request.



Log Washer for removing tough clay and soft rock from various materials.

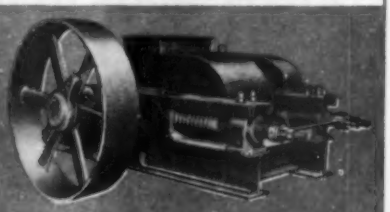


Steel Paddle Mill Scrubber—high capacity for cleaning large size feed.

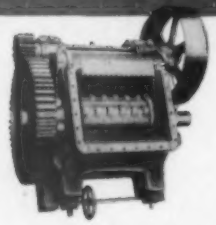
Heavy Duty Reciprocating Plate Feeder. Handles any material from sand sizes to shovel loaded rock and ore.

Live roll Grizzly for sizing and feeding various products.

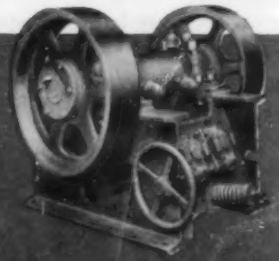
Double duty combination Scrubber and Sizing Screen for large and small capacities.



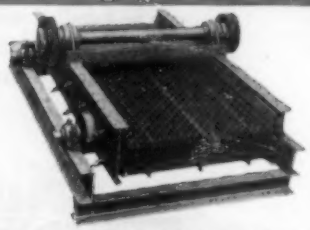
Heavy Duty Fabricated Block Diamond Double Roll Crusher for secondary reduction.



Automatic Steelstrut Crusher for primary and secondary work in small plants.



Fabricated Jaw Crusher for primary and secondary work.



Single and Double Deck Vibrating Screens in different sizes.

DEPENDABLE PRODUCTS:

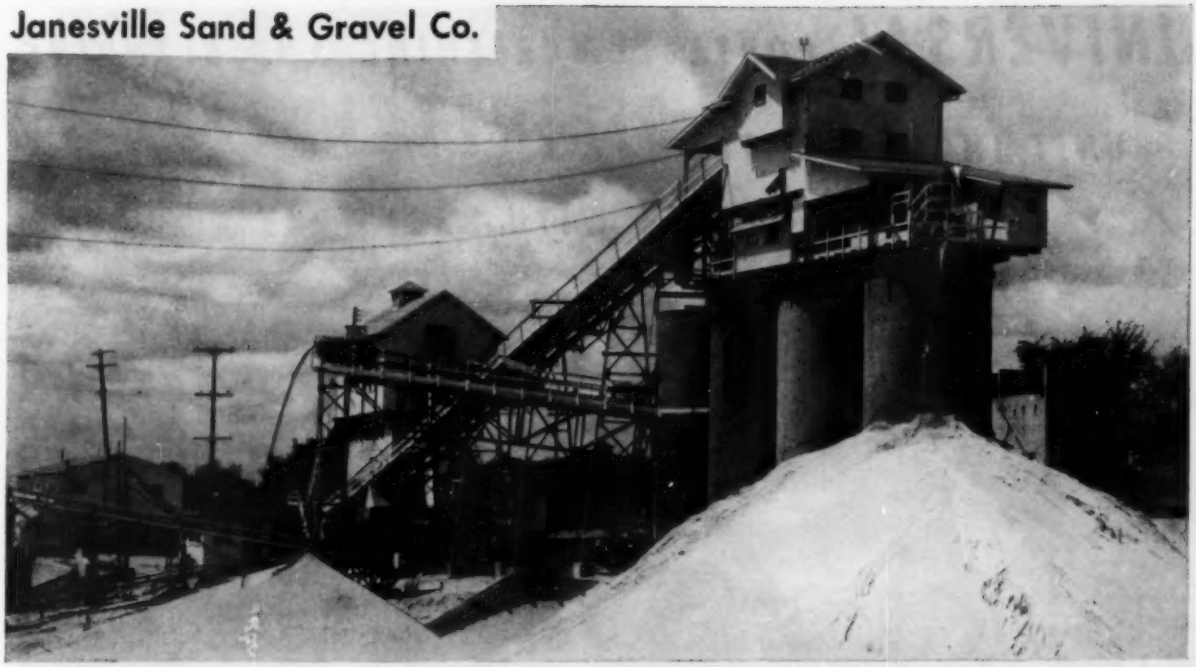
Single and Double Roll—and Jaw Crushers, Crushing Plants, Reciprocating Plate and Apron Feeders, Roll Grizzlies, Conveyors, Elevators, Screens, Scrubbers, Steel Log Washers, Sand Dryers, Hoists, Jigs, Dry Pans, Dryers, Scrap Sundlers, Pulleys, Gears, Bearings, Sprockets, Sheaves, Rollers, Bin Gates, Conveyor Buckets, Gratings, Car Wheels, Ferrous and Bronze Castings.

McLANAHAN & STONE CORPORATION

Pit, Mine and Quarry Equipment Headquarters Since 1835

Hollidaysburg, Pennsylvania

Janesville Sand & Gravel Co.



EVERYTHING WAS RUNNING SMOOTHLY...

Lubrication Problem Causes Costly Breakdown; Cities Service Trojan M Greases Solve It!

The Janesville Sand & Gravel Company of Janesville, Wisconsin, faced a critical situation. One entire plant was forced to shut-down because of a lubrication problem which caused a breakdown of a costly set of bearings in the shaker-screen system.

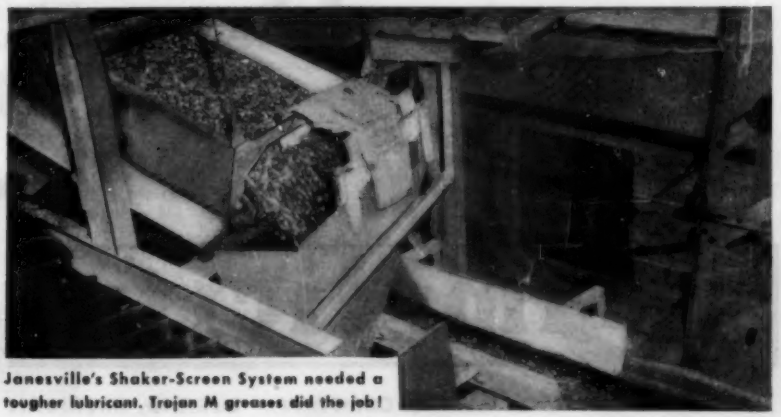
Writes Janesville official, George Meyer: "We were not using your (Cities Service) lubricants in this particular plant at the time, however past experience led us to seek your assistance. Your engineer pointed out the reasons for the bearing failure and outlined the vital functions the lubricant must perform in this operation. He recommended Cities Service Trojan M greases as the best solution to our problem. We tried them and found they give us exactly what we want —maximum performance!"

"Shortly after this incident, we were given a complete industrial survey in which your engineer showed us how we could minimize the number of lubricants, increase equipment life, and assure ourselves of proper lubrication. Our experience enables us to recommend the use of Cities Service industrial oils and greases as well as the technical assistance Cities Service so generously supplies."

UNTIL THIS MACHINE BROKE DOWN!

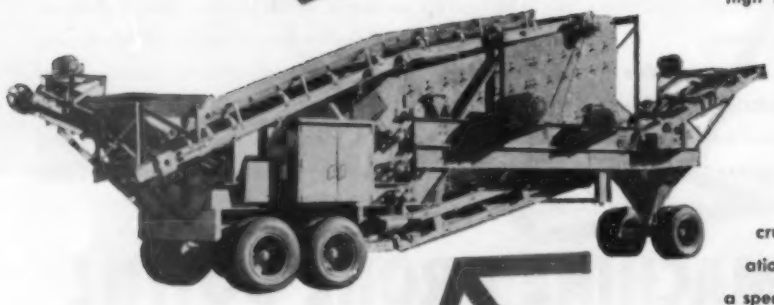
CITIES SERVICE

QUALITY PETROLEUM PRODUCTS



Janesville's Shaker-Screen System needed a tougher lubricant. Trojan M greases did the job!

UNIVERSAL PORTABLE SCREENING AND BLENDING UNIT INCORPORATES SIMPLICITY 5'x14' 3-DECK SCREEN WITH BALL TRAY



At the Anderson-Oxandale aggregate plant in Herington, Kansas, they're getting exceptionally high tonnage of good quality aggregate for State road requirements with a Universal crushing plant and portable screening and blending unit. Heart of the screening and blending unit is a Simplicity 5' x 14' 3-deck inclined gyrating screen equipped with a ball tray deck. Handling up to 150 yards of crushed dolomite limestone an hour at this operation, the 70 square foot Simplicity screen produces a specification aggregate consisting of 100% passing 1", 90% passing ¾" and 50 to 60% passing ¼". Specification of product can be easily varied according to job requirements. To our knowledge this is the largest screen offered in a portable crushing and screening plant.

Simplicity Gyrating Screens with single, double and triple decks are available in a wide range of sizes for fast, accurate and efficient sizing and separating operations. For complete information, consult a Simplicity sales engineer or write us today.

Simplicity
TRADE MARK REGISTERED

ENGINEERING COMPANY • DURAND, MICHIGAN

- **Sales representatives in all parts of the U.S.A.**
- **For Canada: Canadian Bridge Engineering Company, Ltd., Walkerville, Ontario**
- **For Export: Brown and Sites, 50 Church Street, New York 7, N. Y.**

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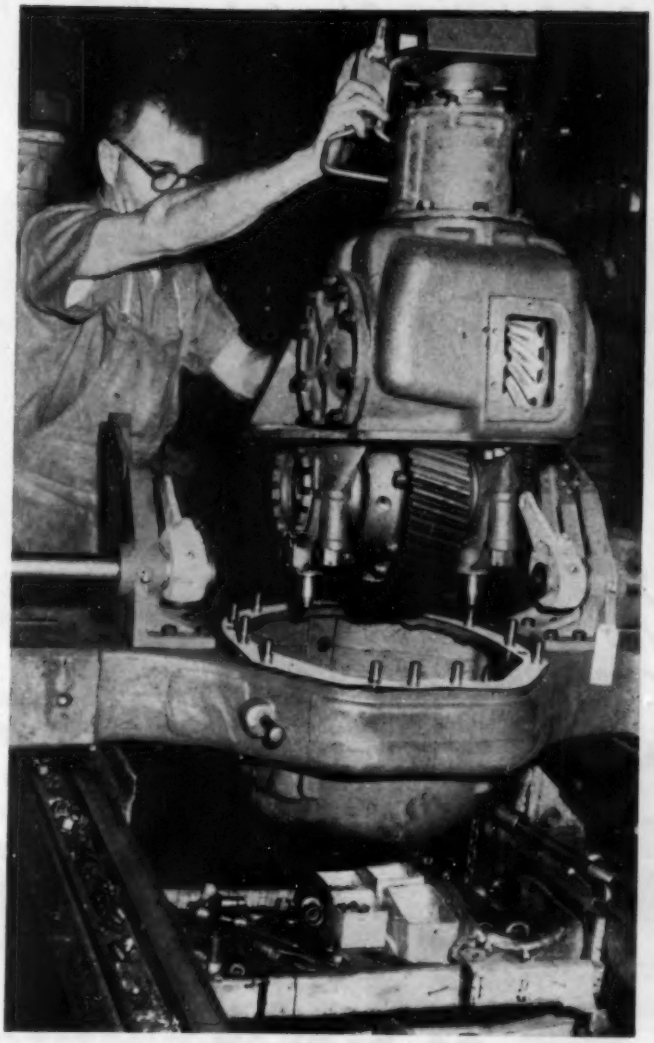


THE DOUBLE REDUCTION REAR

An Autocar Invention

Autocar evolved the double reduction principle in rear axle construction. The patent is dated 1902.

Instead of transmitting the engine power to the driving axles through one pinion and gear, Autocar utilizes two pinions and two gears. Result: rear ends of greater strength and more power.

Gears and pinions are, of course, matched and sound-tested before assembly so that every gear tooth makes proper contact and functions quietly in operation.

When you buy Autocars, you get quality workmanship which assures you of first-year performance for year after year of low-cost hauling.

AUTOCAR TRUCKS

AUTOCAR DIVISION
OF THE WHITE MOTOR COMPANY
Exton, Pa.

Autocar Trucks are sold and serviced throughout the world

NEW AUTOCAR FACT BOOKLET JUST OFF THE PRESS!

Tells you about Autocar's other exclusive advantages.

FILL IN AND MAIL THE COUPON

Autocar Division of The White Motor Company
Exton, Pa.

Please send me the Autocar Fact Booklet.

Name and Title_____

Firm Name_____

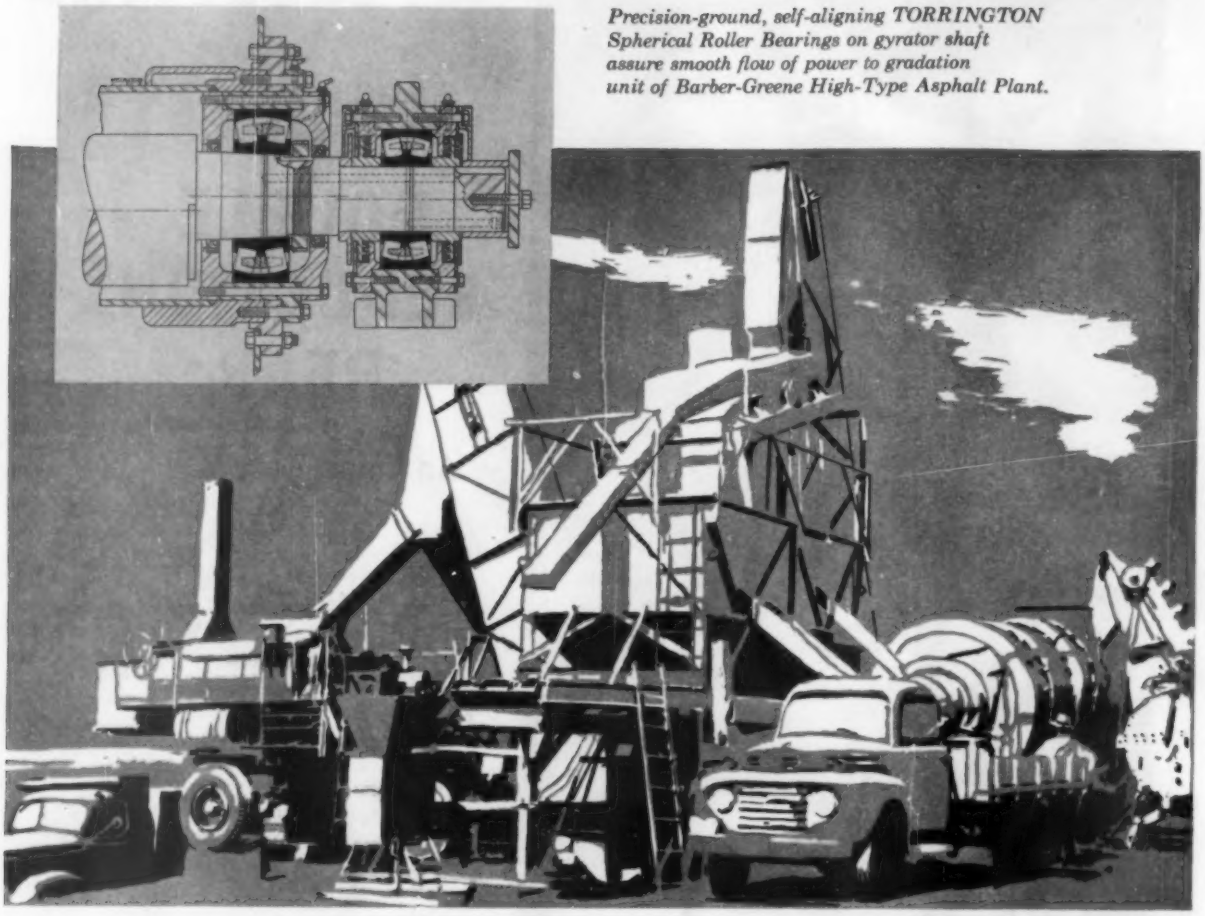
Address_____

No. of trucks in fleet_____

Type of operation_____

24G

TORRINGTON BEARINGS AT WORK



Precision-ground, self-aligning TORRINGTON Spherical Roller Bearings on gyrator shaft assure smooth flow of power to gradation unit of Barber-Greene High-Type Asphalt Plant.

Precision keys to higher profits!

In modern rock processing equipment of every type—from crushers and screens to shovels and cranes—TORRINGTON Spherical Roller Bearings are your keys to better performance, lower costs, *higher profits!* A few of the reasons:

Precision-ground, accurately heat-treated races and rollers—meeting in true geometrical conformity—give you smooth operation, high capacity, maximum resistance to shock and wear. Individual one-piece machined bronze cage for each path of rollers assures freedom of operation. Integral center flange on inner races gives positive radial stability and accurate positioning of thrust loads—*both essential to top performance.* And, especially important in rock processing applications, self-aligning design compensates for possible shock loading, even at sustained speeds.

So for more profit from *all* your heavy-duty equipment under *all* operating conditions, specify TORRINGTON Spherical Roller Bearings. You'll find them available from stock with either straight or tapered bore, for shaft or adapter mounting.

THE TORRINGTON COMPANY
South Bend 21, Ind. Torrington, Conn.

TORRINGTON SPHERICAL ROLLER **BEARINGS**

Spherical Roller • Tapered Roller • Cylindrical Roller • Needle • Ball • Needle Rollers

One of approximately 1200 on the Minnesota Iron Ranges, this 34-ton "Euc" is loaded by a 5 cu. yd. shovel at a large open pit operation. Rear-Dump models are available with semi-rigid or spring mounted axles, Allison Torqmatic drives and transmissions, or conventional 5 and 10 speed transmissions.

More Profit with "Eucs" in Mines and Quarries

■ Built for tough off-the-highway service, Rear-Dump and Bottom-Dump "Eucs" and Euclid Scrapers are cutting the cost of moving ore and overburden, sand and gravel, and stone on quarry and mining operations. Big payload capacity, fast travel speed and high job availability add up to more loads per hour and lower cost per ton or yard hauled.

■ Your Euclid Distributor will provide a hauling production and cost estimate for your operation . . . there's no obligation so get in touch with him soon. Have him show you how Euclid equipment can improve your profit picture.

EUCLID DIVISION

Cleveland 17, Ohio

This Bottom-Dump "Euc" is being loaded with 17 cu. yds. of sand and gravel from an overhead hopper for haul to the washing plant. Owner is Interstate Sand and Gravel of Covington, Ohio.

Ideal Cement Co. of Portland, Colorado uses 22-ton Rear-Dumps with quarry bodies to haul stone from the face to the crusher. Top speed of this Model 36 TD, with full payload, is 32.5 m.p.h. Spring mounted drive axle and Allison Torqmatic drive and transmission are important factors in stepping up production and profits at this quarry operation.

Euclid Twin-Power Scraper stripping overburden at a large gypsum quarry in Iowa. Powered by two 190 or 200 h.p. engines with torque converters and semi-automatic transmissions, this "Euc" self loads, has a struck capacity of 18 cu. yds. and travels up to 30 m.p.h. with full payload.

Euclid Equipment

FOR MOVING EARTH, ROCK, COAL AND ORE

GM GENERAL MOTORS

MOST SENSATIONAL CONVEYANCE
EVER BUILT TO SOLVE A
HAULAGE PROBLEM

IT TOOK NOAH
100 YEARS
TO BUILD THE
FABULOUS ARK . . .

Some stories tell of Noah's building the Ark of timber during 100 actual years. It was a huge ship in every respect with approximate dimensions of 400 ft. in length, 75 ft. wide and 45 ft. high. It presumably had three decks and many small room-like chambers inside it. Noah was 600 years old when the waters overflowed the earth. After seven months and twenty days afloat, the Ark landed on Mt. Ararat.

DART 20S

20 TON CAPACITY . . .
STANDARD MODELS IN STOCK

Undoubtedly the most sensational truck in its class! With a wheelbase of 170 inches (compared to Studebaker Champion, 116½ inches), the New DART 20S turns in 21 ft. radius. 225 or 275 H.P. diesel engine (optional) hydraulic steering, front and rear two-stage springs. Available with conventional transmission or torque converter, the new DART 20S is built to deliver high performance with a minimum of maintenance . . . even on the toughest jobs!

DART 10S DART 20S DART 20SA

DART 10T DART 20T

DART TRUCKS
TONNAGE ENGINEERED

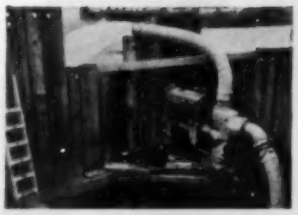
CABLE "DARTRUCO" Kansas City 6, Missouri

SUBSIDIARY OF THE CARDWELL CORPORATION

CALL A DART MAN FOR COMPLETE INFORMATION . . .

BIRMINGHAM, ALA.—S. C. Phillips Tractor Co.
PHOENIX, ARIZ.—Gear Service & Supply
CHARLESTON, W. VA.—W. Va. Tractor & Equipment Co.
CINCINNATI, O.—Carroll & Edwards Equip. Co.
CLEVELAND, O.—Cleveland Contractors Equipment Co.
DALLAS, TEX.—Martin-Lumby Co.
DENVER, COLO.—Western Machinery Co.
DULUTH, MINN.—Myers Motors
HARTFORD, CONN.—R. W. Thompson Co.
KANSAS CITY, MO.—Funkhouser Equipment
KNOXVILLE, TENN.—Osborne Equipment Co.
LOS ANGELES, CALIF.—Smith-Booth Usher Co.
NASHVILLE, TENN.—McCarthy, Jones & Woodard
OAKLAND, CALIF.—C. W. Green Co.
OAK LAWN, ILL.—Tractor & Equipment Co.
PHILADELPHIA, PA.—Service Supply Corp.
PORTLAND, ORE.—Balzar Machinery Co.
PRESCOTT, ARIZ.—Prescott Tractor Sales
ROCKAWAY, N. J.—Clifden Rockrail Co.
SALT LAKE CITY, UTAH—Arnold Machinery Co.
SEATTLE, WASH.—Bostlake Equipment Co.

Action Scenes at Sandusky River bridges. They're doing this around the clock.



Pump Continuously to Lick Turnpike Bridge Problem!

Unexpected difficulties have been encountered on the Sandusky River bridge near Fremont, Ohio. Sixteen piers and four abutments are required to support the twin spans of the turnpike. Continuous pumping has been necessary to keep the cofferdams dry for construction of the piers.

George Vang, Inc., Pittsburgh, Penn., the contractor, moved 10 Gorman-Rupp Contractors' Pumps onto the job at the beginning in April, 1953. The performance of these pumps has won high praise. Charles Copenhaver, general superintendent, says: "We are well satisfied with the Gorman-Rupp pumps — doing a wonderful job."

Often the pumps have worked around the clock and the men in 3 shifts. Charles Solander, pump operator: "I've had them running 3 weeks at a time, 24 hours a day, and no trouble."

Gorman-Rupp manufactures a full line of contractors' pumps from 1½" up to the big 10-inch pumping 240,000 gallons per hour.

Ask for Contractors' Pump Bulletin

This torrent of water is coming from a Gorman-Rupp 240 M, 10-inch Pump.

GORMAN-RUPP PUMPS

THE GORMAN-RUPP COMPANY • MANSFIELD, OHIO

Barber-

Mixall

Greene

. . . THE NEW B-G Mixall

MIXES ALL THE HOT PATCH YOU NEED, ANY TIME, ANYWHERE, ANY WEATHER

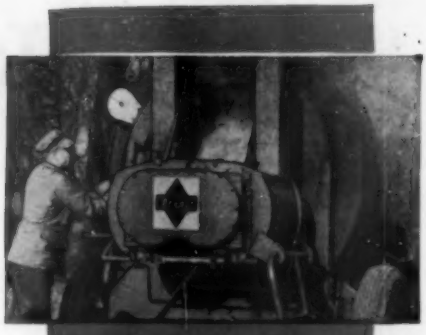
Now, the new Barber-Greene Mixall gives you the opportunity to offer high quality bituminous paving for driveways, sidewalks, service stations, industrial plants, parking lots . . . and other "black top" jobs at new low costs.

The Mixall, a completely new, compact and portable small-job maintenance and paving mixer, will produce up to 5 t.p.h. of any type hot mix . . . up to 10 t.p.h. of cold mix . . . will produce low slump Portland cement mixes. Built to be towed behind the aggregate truck for on-the-spot mixing, the Mixall is just as well suited for central plant or stock pile operation. The Mixall can work in any weather . . . even drying frozen aggregates.

Think of what you could do with the new B-G Mixall in your territory. Then see the Mixall at your first opportunity . . . or write for full information.

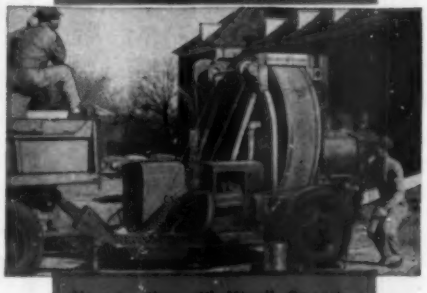
THE ONLY SMALL JOB MAINTENANCE MIXER WITH...

- ROTARY DRUM DRYING: The same principle used in largest B-G Continuous Dryers.
- TWIN SHAFT HEATED PUGMILL: "Kneading" action assures even coating of every aggregate particle.
- POWER SKIP HOIST: Only 14" high for easy charging.
- HIGH DISCHARGE: Can discharge directly into place, into wheelbarrows or gas buggies.



For parking lots, factory floors . . . on-the-job drying of aggregates, complete control of mix.

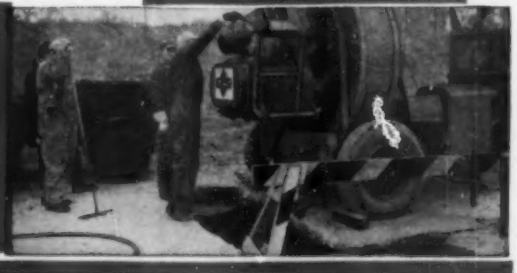
For playgrounds, tennis courts, roads and streets . . . scattered jobs . . . variations of mixes.



No setup time with Mixall. Operate it hitched to truck for drives, sidewalks, other small jobs.

"Stitch-in-time" maintenance prevents major break-ups; the Mixall works in any weather.

Resurfacing busy crossings, Mixall's compactness allows minimum traffic interference.



Barber-Greene

BG

Aurora, Illinois, U. S. A.

balanced △ design

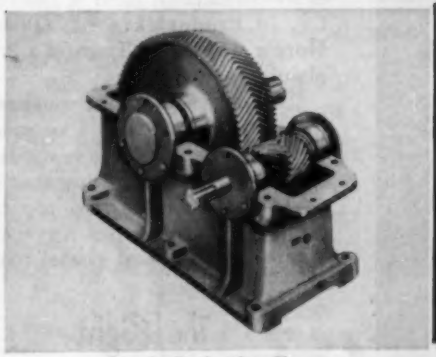
BALANCED DESIGN . . . adds to the life of Philadelphia Herringbone Gears and Speed Reducers. In addition to the Sykes continuous tooth, Philadelphia also manufactures Staggered or Separated tooth gears of the Herringbone type in sizes up to 150 inches diameter. For heavy duty industrial drives, the Herringbone Gear provides maximum efficiency and economy.

EFFICIENT, because overlapping tooth design provides smooth, quiet power transmission with almost no power loss between gears.

ECONOMICAL, because the Herringbone tooth design has greater inherent strength, thus permitting the use of gears of less dimensions than might otherwise be employed. Also, the balanced axial thrust forces eliminate the necessity of heavy bearings to absorb these forces.

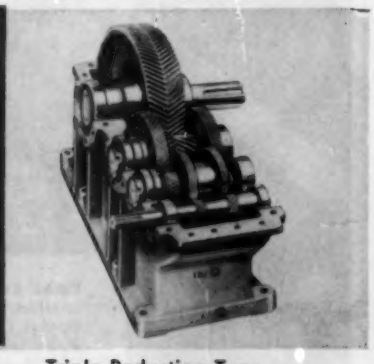
The balanced design of Philadelphia Herringbone Reducers is carried one step further in completely balanced gear units. Philadelphia reducers, illustrated below, show how the Herringbone and opposed helical gears are nestled within one another,—thus providing a wide, stable housing with balanced gear and bearing loads.

Write for Catalogue H-49.



Single Reduction Type

Double Reduction Type



Triple Reduction Type

PHILADELPHIA GEAR WORKS, INC.

ERIE AVE. AND G ST., PHILADELPHIA 34, PA.
NEW YORK • PITTSBURGH • CHICAGO • HOUSTON • LYNCHBURG, VA.

Industrial Gears & Speed Reducers

LimiTorque Valve Controls

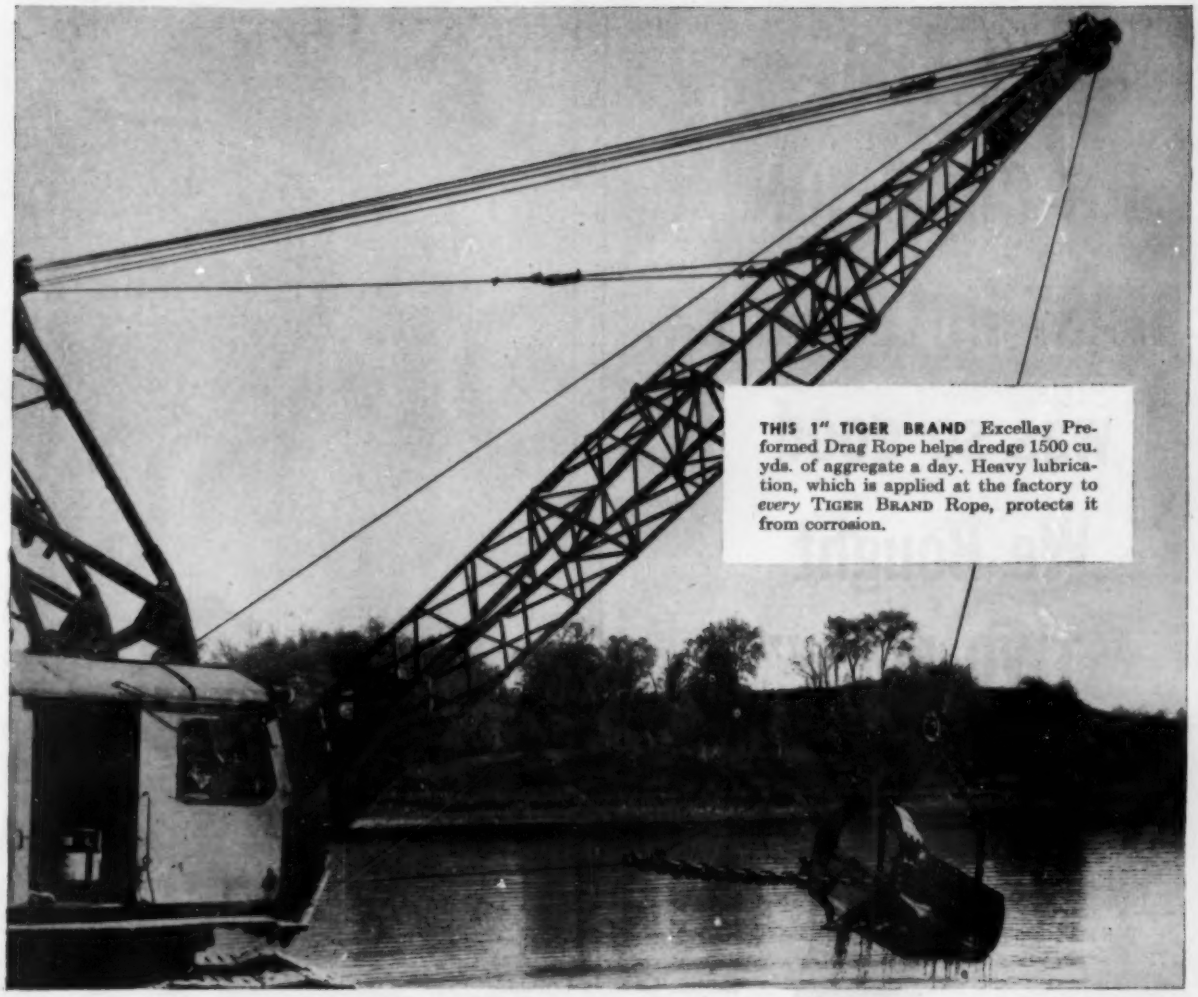
"Abrasion and corrosion *the worst*... Tiger Brand Wire Rope *the best!*"

says C. G. TUGEND, FREDERICKTOWN SAND & GRAVEL CO.

EVERY ROPE on all 5 excavating and materials handling machines at Fredericktown Sand & Gravel Co. is TIGER BRAND. This important stone processing company consults frequently with American Wire Rope Engineers and follows their recommendations to get the best possible service from each rope.

● If you want to know how good TIGER BRAND Rope is, just talk to C. G. Tugend, Secretary-Treasurer and General Manager of Fredericktown Sand & Gravel Co. in Fredericktown, Ohio. Here's what Mr. Tugend says about TIGER BRAND:

"We have some of the toughest operating conditions I've ever seen for wire rope. We're dredging in corrosive river water that is 7% sodium sulfate. On top of that, our drag ropes have to scrape through hard glacial rock



THIS 1" TIGER BRAND Excellay Preformed Drag Rope helps dredge 1500 cu. yds. of aggregate a day. Heavy lubrication, which is applied at the factory to *every* TIGER BRAND Rope, protects it from corrosion.

along the river. TIGER BRAND Rope works in these conditions constantly, yet has never shown any sign of rust and requires only a normal replacement. That's why we use it exclusively on all our equipment.

"We did try a different brand of rope *once* . . . on our 2½ cu. yd. Sauerman Hoist. But that will be the last time. The new competitive rope carried the same catalog specification as the TIGER BRAND Rope it replaced, yet the new one lasted less than ⅓ as long, contracted unevenly, and kinked so badly that it jammed the pulleys. We spent 6 days repairing that rope . . . lost 9,000 tons of production.

"Since that costly experiment, we've been using TIGER BRAND Rope *exclusively*. It has never shown a tendency to kink; and it is extremely pliable and strong. It has never given one bit of trouble."

For ropes that will give *you* high quality service, time after time, specify TIGER BRAND. Send the coupon for more information.

American Steel & Wire
Rockefeller Building
Cleveland 13, Ohio.

Please send me, without obligation, a copy of your helpful wire rope recommendation book, "The Right Rope for the Job."

Name.....

Company.....

Address.....

City.....State.....

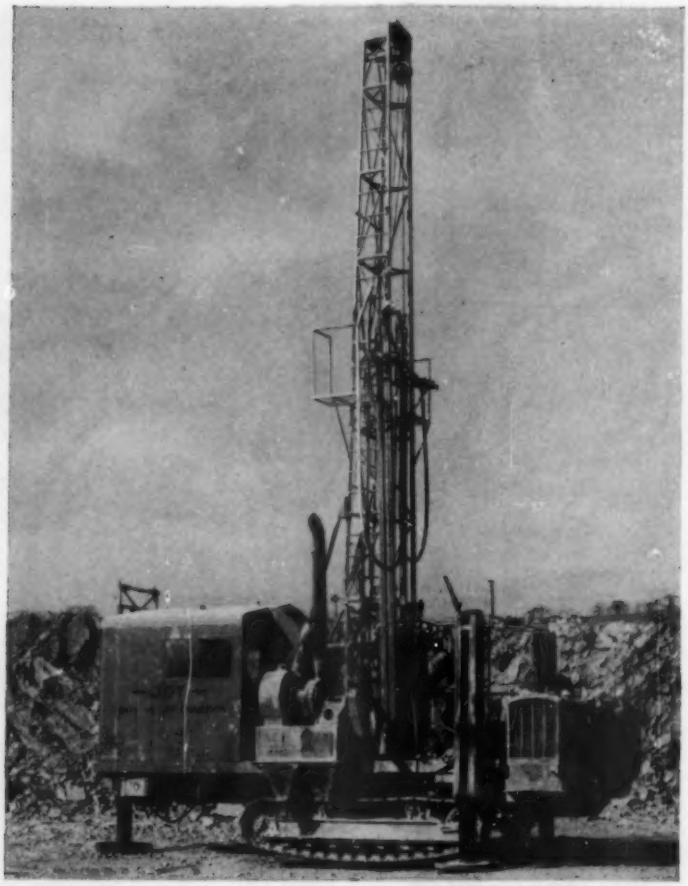
AMERICAN STEEL & WIRE DIVISION, UNITED STATES STEEL CORPORATION, GENERAL OFFICES: CLEVELAND, OHIO
COLUMBIA-GENEVA STEEL DIVISION, SAN FRANCISCO · TENNESSEE COAL & IRON DIVISION, FAIRFIELD, ALA., SOUTHERN DISTRIBUTORS
UNITED STATES STEEL EXPORT COMPANY, NEW YORK

USS AMERICAN TIGER BRAND WIRE ROPE

Excellay Preformed

UNITED STATES STEEL

"...this JOY CHAMPION BLAST HOLE DRILL was so good We Bought TWO More"



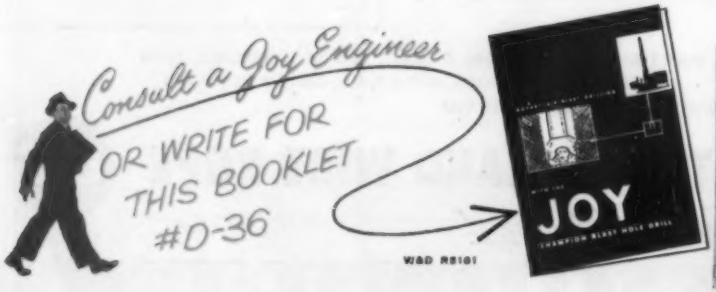
"IT OUTDRILLS SEVEN CHURN DRILLS"
at the G. & W. H. Corson Quarry, Plymouth Meeting, Pa.

CHARLES LAUMAN
CONTRACT BLAST HOLE DRILLER
NORRISTOWN, PA.

"That's not all," states Contract Driller Charles Lauman. "Most of our drilling is in hard, tough dolomite with strata tilted at all angles and loaded with clay pockets and clay seams. We have found that the 58-BH Joy Champion will drill a smoother vertical hole wherever the hole is spotted. This eliminates toes and gives our customers a straight vertical face. We're convinced it's the best machine for the job—so much so that we bought two more on the strength of this one's production."

The Joy Champion DRILLS DRY with a tri-cone roller bit which continuously pressure-cuts the rock. An air-blast, forced down the drill pipe and through the bit, cools the bit and forces cuttings to the surface.

The Champion drills straight, smooth-walled, easily loaded holes up to 7⅞" diameter and to any quarrying depth required. It moves fast between holes and sets up quickly for drilling on three hydraulic jacks. Two Champion models—Mediumweight and Heavyweight—can be furnished with either electric or diesel drive. ***Joy Manufacturing Company, Oliver Building, Pittsburgh 22, Pa.*** In Canada: *Joy Manufacturing Company (Canada) Limited, Galt, Ontario.*



JOY

WORLD'S LARGEST BUILDER OF CORE DRILLS, ROTARY BLAST HOLE DRILLS AND MOTORIZED DRILL RIGS

Photograph by Howard Luray

For Moving Mountains...or Digging Coal...

Standardize on AMERICAN Explosives and Accessories

Wherever the stroke of the detonator sets the earth shaking, American blasting materials help speed the work.

Experienced shooters everywhere rely on American explosives because they know they're dependable—that they're produced by modern methods and under strict laboratory control to give the results that shooters want. Available in a wide range of densities, velocities and strengths, American explosives are designed to do your job best—because constant field research tells us what you need. Capable field engineers are available at your call.

HIGH EXPLOSIVES • PERMISSIBLES • BLASTING POWDER • BLASTING ACCESSORIES

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Sales Offices: Pittsburgh, Pa., Bluefield, W. Va., Scranton, Pa., Chicago, Ill., Pottsville, Pa., Maynard, Mass.

GET TRUCK PAYLOADS!

with the DEMPSTER DIGGSTER® GRD-101

The two photos above show some very important advantages you get when you use a Dempster-Diggster GRD-101. Photo directly above shows you why you have no truck shock with a Dempster-Diggster. You can lay bucket in truck body, trip latch and pull bucket up off load. Photo at right above shows you why you get a truck payload with a Dempster-Diggster . . . and how natural and easy it is to do so. This truck is now loaded to maximum heaped capacity, yet Dempster-Diggster has ample clearance. The dumping height is 9'6" and the digging height is approximately 15 feet. This enables the Dempster-Diggster to work with high dump equipment.

Other very important features of the new Dempster-Diggster GRD-101 include: AN EXCAVATOR THAT NEEDS NO WHEEL TRACTION (loading of bucket is accomplished by the exclusive Hydraulic Crowd and Hoist Action of the Dempster-Diggster) . . . TRUCK-SPEED MOBILITY TO AND FROM JOBS . . . AUTOMATIC BUCKET TRIP . . . MINIMUM TURNING RADIUS . . . THE SHOVEL WITH TORQUE CONVERTER . . . HYDRAULIC STEERING. Here's a shovel that gives you extra speed on the job and to and from jobs that means extra profits to you! Pound for pound, dollar for dollar, the Dempster-Diggster GRD-101 will out-dig and out-load any other available competing machine in tough going! Let us prove that statement! Write for complete information. Manufactured by Dempster Brothers, Inc.

DEMPSTER BROTHERS

274 N. KNOX, KNOXVILLE 17, TENESSEE

BASALT

in ALL its operations uses SHELL ROTELLA OIL exclusively

Basalt Rock Co., Inc., Napa, California, engages in a wide range of industrial operations . . . all requiring the use of heavy power equipment. Both heavy-duty gasoline and diesel engines are operated by Basalt . . . and Shell Rotella Oil is used exclusively as the crankcase lubricant.

Basalt is just one of the many operators of heavy equipment who are getting superior lubrication and reducing costs with Shell Rotella Oil. Here are several reasons why Basalt depends on this one lubricant:

Shell Rotella Oil fights one of the chief causes of engine parts wear. It eliminates cylinder and bearing pitting caused by acid residue from incomplete combustion and low jacket temperatures.

Shell Rotella Oil gives greater over-all economy. Engine parts stay clean and operate efficiently for longer periods. Extending time between overhauls means worth-while savings in labor and parts.

If you operate heavy-duty engines, gasoline or diesel, let us show you the many benefits of using Shell Rotella Oil. *For latest information write to:*

SHELL OIL COMPANY

50 WEST 50TH STREET, NEW YORK 20, NEW YORK
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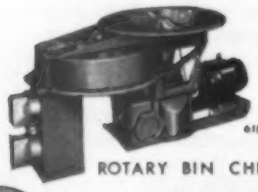
SHELL

ABOVE: JEFFREY-TRAYLOR WAYTROL AT WORK IN LARGE CEMENT PLANT.

ELECTRIC VIBRATING FEEDER

"WAYTROL" WEIGHBELT



ROTARY BIN CHECK VALVE

Jeffrey-Traylor "WAYTROL" feeds and weighs continuously

The Jeffrey-Traylor WAYTROL Constant Weight Feeder provides guaranteed accuracy within plus or minus 1% when belt speed is constant.

In the above installation a Jeffrey-Traylor Electric Vibrating Feeder delivers the material from the supply hopper. Its rate of discharge is controlled by an instantaneous, positive electrical system. It feeds to the Weighbelt which operates like a highly sensitive laboratory balance at constant or variable belt speeds.

If fine, fluffy materials are handled, a Jeffrey-Traylor Rotary Bin Check Valve is installed on the bottom of the supply hopper to assure continuous supply to the electric vibrating feeder.

The inherent accuracy of WAYTROLS is now serving many industries which handle scores of different products in their weighing and proportioning systems. *Write for full information.*

OTHER JEFFREY-TRAYLOR EQUIPMENT:

FEEDERS • DRYERS • PACKERS • COOLERS • CONVEYORS • SCREENS • CONTROLS • BATCHERS

THE JEFFREY MANUFACTURING CO.

ESTABLISHED 1877

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sales offices and distributors in principal cities

PLANTS IN CANADA, ENGLAND, SOUTH AFRICA

IF IT'S MINED, PROCESSED OR MOVED

. . .IT'S A JOB FOR JEFFREY!

the multiwall bags backed by 107 years of know-how . . .

CHASE Multiwalls

Call on your "C"-Man, your Chase representative. You can't put your problems in more capable hands. You can't put your products in better bags.

Sewn valve, sewn open mouth, pasted valve, pasted open mouth

For samples and current prices, write Department 15-G

SINCE 1847

CHASE BAG COMPANY

General Sales Office: 309 West Jackson Blvd., Chicago 6, Illinois

30 BRANCHES AND SALES OFFICES—STRATEGICALLY LOCATED

Your P&H dealer has it!

NOW...

at the industry's lowest price!

Step out in front with

MITI-MITE

Here's why more and more users are buying MITI-MITE — for new ideas —money-saving performance—proved design.

Tops in Quality Construction

It's the simplest, most rugged, most dependable little truck crane ever built — with all the honest-to-goodness quality the P&H name implies! It's easier to operate. And by far the easiest machine of its kind to maintain.

Lowest Price

No other small truck crane gives you so much for so little money. It's loaded with modern features as standard equipment — not extras at additional cost.

Greater Earning Power

For 101 jobs all over the map! P&H's greater stability lets you put "more on the hook" — work faster on any kind of job with less danger of tipping. Greater work capacity means more earning power — more money in your pockets.

It will pay you to buy **now.** Place your order today!

P&H

MITI-MITE

(Model 55)

Fully convertible. 11 cu. ft. capacity as hoe, shovel, etc. 7 tons as a crane. It's a terrific buy!

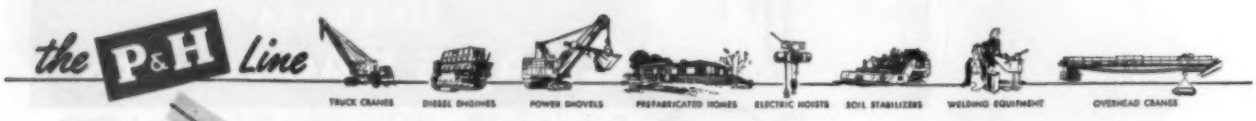
P&H TRUCK CRANES

HARNISCHFEGER

CORPORATION

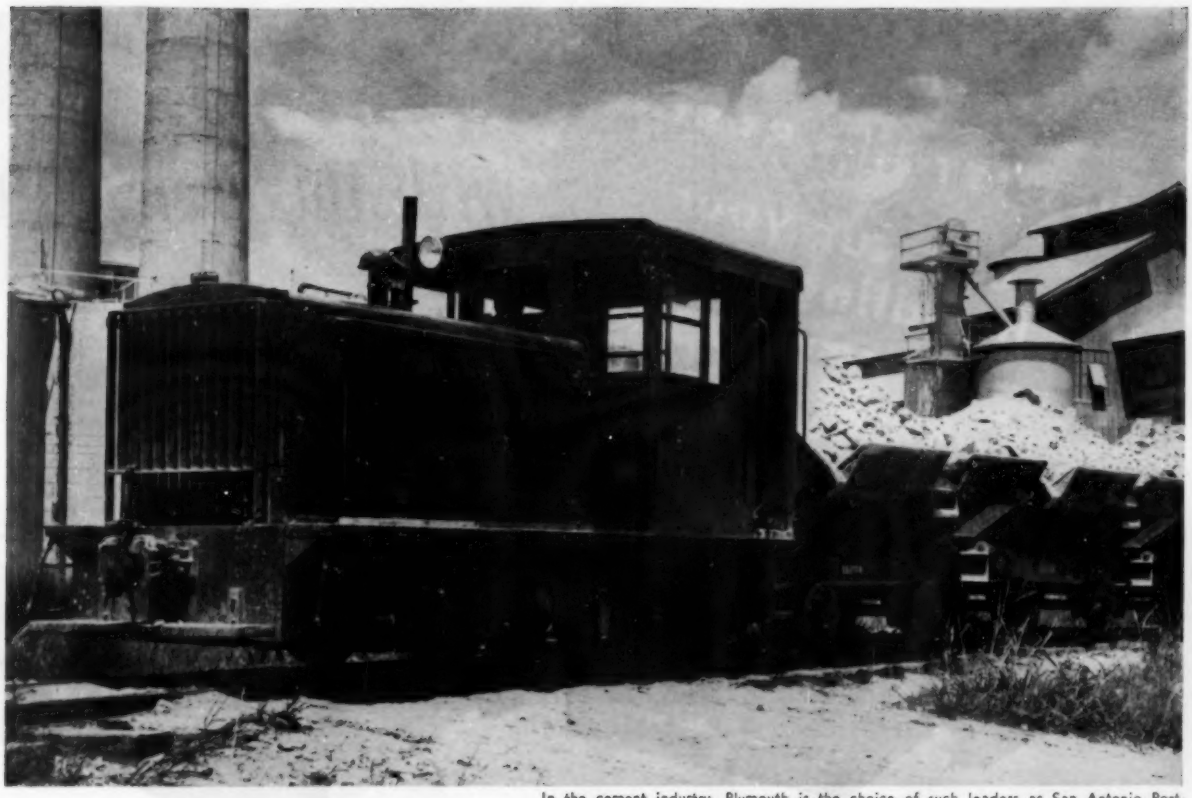
Milwaukee 46, Wisconsin

the P&H *Line*



See your P&H dealer NOW!

"Your P&H Dealer has the experience, the organization and the facilities to serve you reliably in every way. He's ready to deliver the kind of on-the-ground service that keeps your jobs moving on schedule. Your P&H dealer is tops in the business. Get to know him."



In the cement industry, Plymouth is the choice of such leaders as San Antonio Portland Cement Company. This photo was made at their Cementville, Texas, plant.

LOOKING FOR QUALITY?

You'll find it in a PLYMOUTH

Hauling stone from quarry to crusher is one of the heaviest jobs in today's booming cement industry. To carry out this day-in, day-out assignment with a minimum of expense and maintenance, leading companies choose Plymouth Locomotives.

Their confidence in Plymouth proves to be justified. "We rate the Plymouth's efficiency high," says one Purchasing Agent. "Our Plymouth does a far better job than our former locomotive. It's more powerful, never stalls, hauls four loaded cars up a 5% grade and around tight turns. We run it 45 hours a week."

Get the same hauling efficiency on your job—get a PLYMOUTH! Models range from 3 to 70 tons . . . narrow and standard gauge . . . gasoline and Diesel-mechanical, gasoline and Diesel-Torqomotive,* or Diesel-electric Drive.

For full information write: PLYMOUTH LOCOMOTIVE WORKS, Dept. A-15, Plymouth, Ohio.

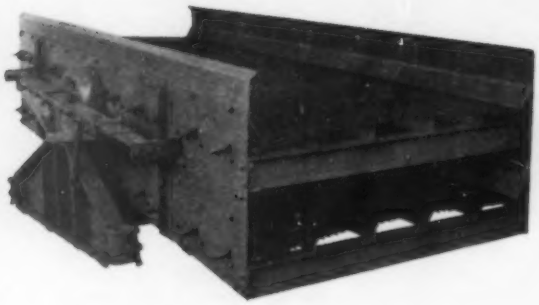
* Torqomotive Drive: Plymouth transmission with hydraulic torque-converter.

PLYMOUTH® TORQOMOTIVES

ALSO MANUFACTURERS OF F-R-H CERAMIC MACHINERY

HEWITT HR ROBINS can cut your handling costs *with this complete*

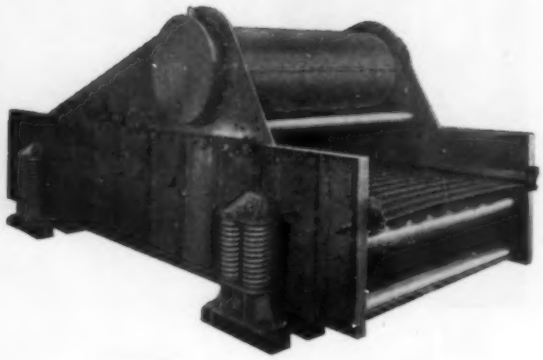
FOR SCREENING



GYREX°

Positive Stroke 4-Bearing Screens

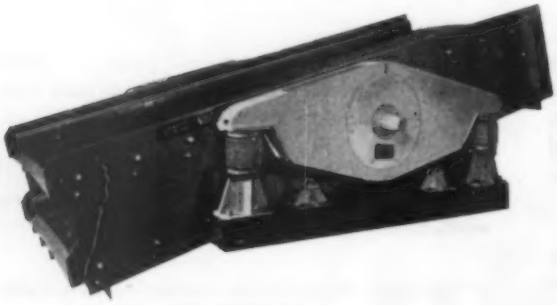
STROKES: ¼" at 1,000 r.p.m. and ½" at 625 r.p.m.
SIZES: Complete range of standard sizes from 48" x 78" to 72" x 192".
DECKS: Single—Double—Triple.
MOUNTINGS: Anvil-type cast iron base with *exclusive angle adjustment* for floor mounting—Steel I-beam base for suspended or rigid mounting.



ELIPTEX°

Horizontal Operating Flat Screens

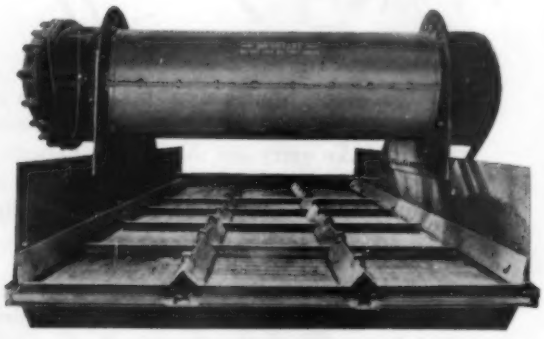
STROKES: 7/16" nominal at 1,000 r.p.m.—Other stroke and speed combinations available to meet special applications.
SIZES: All standard sizes from 36" x 96" to 72" x 240".
DECKS: Single—Double—Triple.
MOUNTINGS: Floor mounted or Suspended arrangement.



VIBREX°

Full-Floating, Unbalanced Pulley-Type 2-Bearing Screens

STROKES: Available in many stroke and speed combinations ranging from ⅛" at 1,800 r.p.m. to ½" at 660 r.p.m. —All Vibrex screens have readily adjustable stroke to meet the most exacting operating conditions.
SIZES: All standard sizes from 16" x 30" to 72" x 192".
DECKS: Single—Double—Triple.
MOUNTINGS: *Exclusive angle adjustment* for floor mounting —Cable arrangement for suspended mounting.



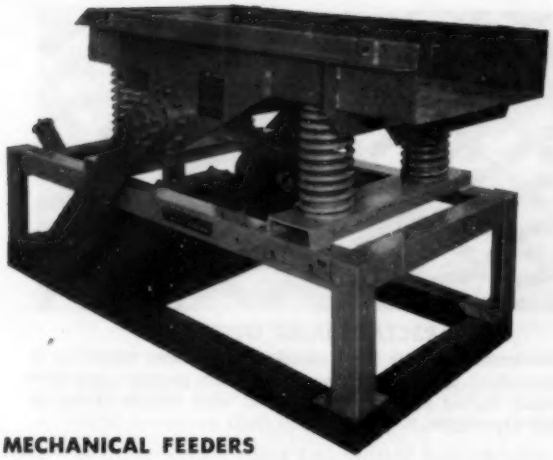
ELIPTEX DEWATERIZER

Specially Designed Eliptex Screen With Micron-Size Opening Stainless Steel Flat Rod Deck

STROKE: Extra-full stroke operating at high speed for maximum efficiency to handle even the most difficult dewatering problems.
SIZES: All standard sizes from 36" x 144" to 72" x 192".
DECKS: Single—Double.
MOUNTINGS: Same as Eliptex Screens.

line of Vibrating Equipment

FOR FEEDING & CONVEYING



MECHANICAL FEEDERS

A *fully mechanical* vibrating feeder that is easily maintained by your own personnel. Extremely high capacities at very low power consumption.

FEED CONTROL: Remote, wide range, variable speed controls available.

STROKE: Full 3/16" at 1,000 r.p.m. readily adjustable . . . ideal for handling material of varying characteristics.

SIZES: All standard sizes from 24" x 48" to 48" x 96".

MODELS: Standard—Heavy duty models and special pans and deck designs available . . . suspended or base mountings.

VIBRATING CONVEYORS

A continuously balanced vibrating conveyor offering longer units with higher capacities at lower horsepower than ever before available. Ideal for handling a wide range of materials be it wet or dry, lump or pulverized, packaged or loose, hot or cold, abrasive or corrosive.

SIZES: Standards from 8" to 48" wide up to 150' long with single drive.

STROKE: Full strokes from 1/4" to 3/8" at speeds of approximately 750 r.p.m.

MODELS: Standard—Heavy duty models and special pan designs and arrangements available.

FOR SHAKING OUT

CAR SHAKEOUTS

Will handle wet, compacted and even partially frozen loads. Capacities vary depending upon characteristics of material . . . Typical unloading time under 5 minutes per car.

MODELS: 5-Ton HD (Heavy-Duty) for handling up to 100 cars per day—3½-Ton GS (General Service) generally recommended for up to 10 cars per day. Both models available with companion twin-hook Car Shakeout Hoist.

STROKE: 5/32" at 1,500 vibrations per minute (easily adjusted for specific applications).

Patent No. 2,504,789

FOUNDRY SHAKEOUTS

Successfully used in steel, iron and non-ferrous foundries of all types (production and jobbing) handling castings weighing from a few ounces up to 60 tons.

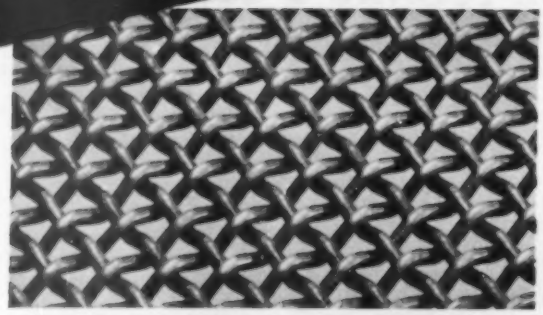
SIZES: From 2' x 2' to 8' x 10' in single units. Multiple unit arrangements up to 16' x 33'.

CAPACITIES: Up to 300,000 # (150 tons) in multiple units.

STYLES: Standard Stationary, Portable, Gravity Self-Discharging and Mechanical (Horizontal) Self-Discharging.

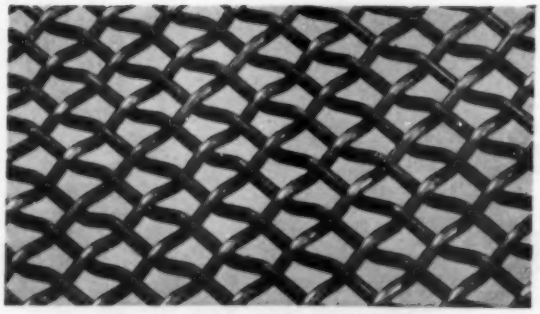
AND FOR YOUR SCREEN CLOTH NEEDS

HEWITT HR ROBINS
can cut your handling costs
with a complete



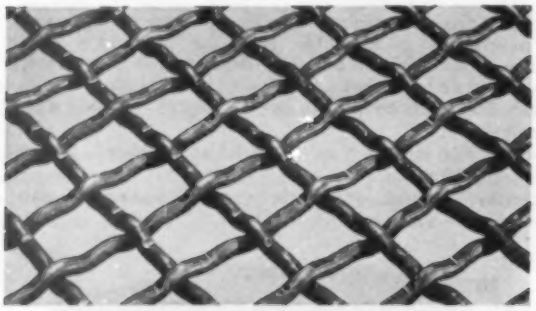
SQUARE OPENING DOUBLE CRIMP

All wires are specially crimped so that a spring tension permanently locks them together at each intersection. This guarantees tightness of weave and accurate sizing because openings cannot vary.



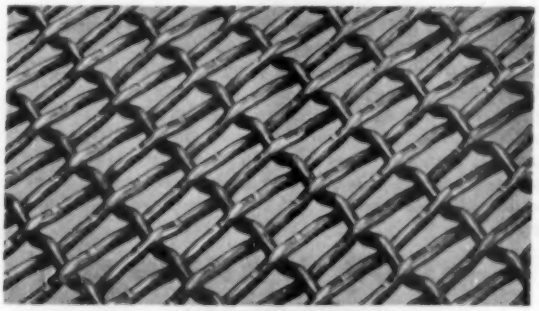
RECTANGULAR OPENING

Recommended for high speed sizing where accuracy is secondary. Rectangular weave provides greater open area hence higher capacity. Furnished with double crimp or flat top weave.



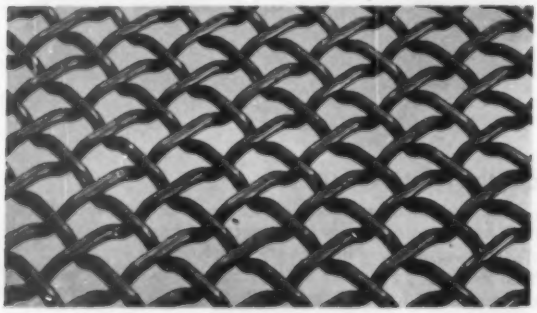
SQUARE OPENING LOCK CRIMP

Ideal for scalping. Has additional crimp to lock wires together under pressure to prevent wires from shifting as a result of impact and handling of oversize materials.



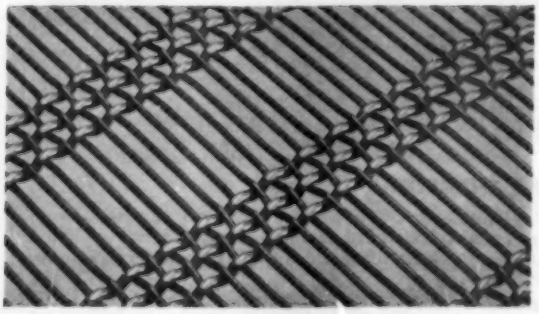
NON-SPREADER

Best for high speed sizing of coarse materials. Heavy-duty wires assist in maintaining accuracy of opening even under impact of wedge-shaped stone and over-sized materials.



FLAT TOP

Crimp characteristics provide smooth screening surface. Absence of high spots, as in other types of crimp, permits free flow and reduces abrasive action of material. Assures longer wear, faster screening and less degradation.



NON-BLIND

Recommended for processing moisture-laden materials that plug or blind openings. Slotted openings kept free from blinding due to secondary vibration set up in longer span wires. Clustered wires carry heavy tension and are crimped to maintain width of opening.

line of Screen Cloth

Each Type of Hewitt-Robins Screen Cloth is Specially Engineered To Accurately Size Large Tonnages . . . Last Longer . . . Cut Your Screening Costs

Hewitt-Robins Screen Cloth guarantees overall sizing accuracy through precision-weaving of individual screen cloth wires. You get longer service because Hewitt-Robins utilizes a full range of metals in its selection of wire to assure that each panel of screen cloth is matched to meet individual job requirements. Types of wire range from genuinely oil-tempered through spring steel, stainless steel, enamel-coated and on to special alloys of extraordinary corrosion and heat resistant properties.

In specific installations where the more abrasive materials such as coke, iron ore, stone, gravel and coal are handled, specify Hewitt-Robins Super-Gyraloy. It's the specially treated oil-tempered wire that combines hardness—stiffness—elasticity—ductility—toughness . . . and must pass exacting laboratory tests for uniformity of these properties.

For operations involving a dust factor aggravated by moisture (as in sizing fine coke and iron ore) specify Hewitt-Robins Super-Gyraloy Enamel Coated Screen Cloth. The enamel coating prevents the build-up of the blinding compound . . . protects the surface against moisture and averts oxidation of the metal.

Where initial cost is of primary consideration and abrasion is not excessive, Hewitt-Robins Gyraloy® spring steel screen cloth provides maximum efficiency and economy. For special applications Hewitt-Robins Screen Cloth comes in plain or galvanized steels, brass, phosphor-bronze, Monel and other ductile alloys.

Hewitt-Robins Screen Cloth is available in standard production size openings from 3/16" and coarser . . . wire sizes from .105" diameter up to and including 1" diameter.

For complete information regarding the kind, type and opening of Hewitt-Robins Screen Cloth to best fit your operation . . . give you highest screening efficiency at lowest cost per ton . . . contact Hewitt-Robins Incorporated, Robins Conveyors Division, 270 Passaic Avenue, Passaic, New Jersey, or your nearest Hewitt-Robins representative.

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about preventing costly breakdowns in your preparation plant by using Homer Magnetic Separators

Homer permanent non-electric magnetic separators, are the products of specialized manufacturing — they are twenty-four hour a day watchdogs for industry, serving practically every phase in eliminating lost production, down-time and extra maintenance cost due to TRAMP IRON.

Too, they are serving many plants in manufacturing and processing industries, where it is necessary to concentrate ferrous from non-ferrous materials in any form.

If you need magnetic separation of any type, we invite you to call on us for assistance. There is no obligation to you for consultant service. The Homer Manufacturing Company, Inc., Dept.1-52, Lima, Ohio.

Remember...

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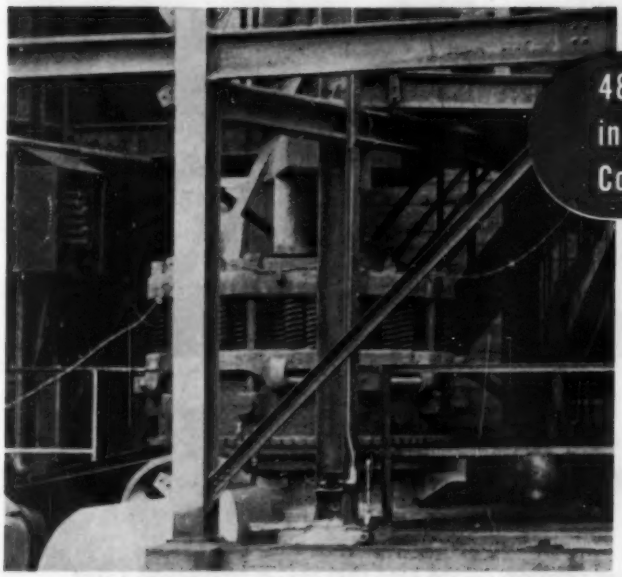
Certain!

HOMER

Photo at left shows two Type F HOMER permanent magnetic separators installed on a Beardsley & Piper sand slinger. These magnets were mounted on the small conveyor which feeds the slinger head. This installation was successful not only in removing damaging tramp iron, but also removed small "BB" shot which happened to be mixed with the sand. The Homer separators were also credited with the elimination of approximately $100 cost per day in repair parts and replacement labor only, and did not take into consideration production loss caused by equipment "down-time."

TELSMITH

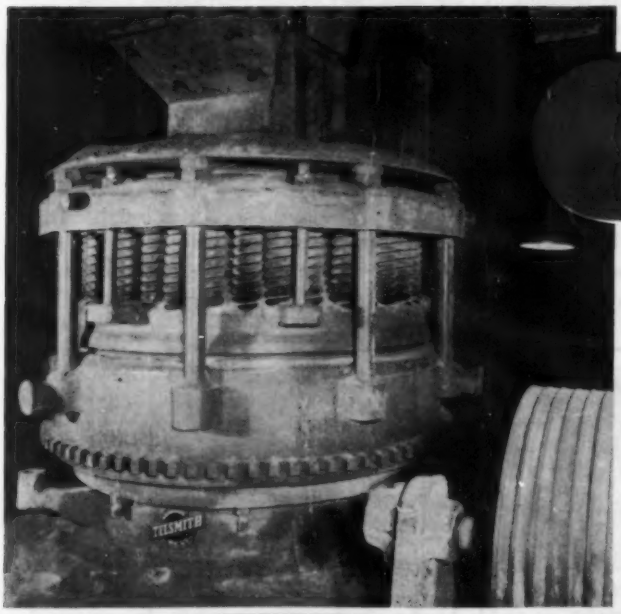
®Gyraspheres in CEMENT MILLS



48-FC Telsmith Fine Crushing Gyrasphere in the British Columbia Portland Cement Company Limited plant at Victoria, B. C.

The British Columbia Portland Cement Company Limited wanted to deliver a finer feed to their cement grinding mills—and thus increase output. To do it, they installed early in 1952, a Telsmith 48 Fine Crushing Gyrasphere to crush cement clinker from 2″ to minus 3/8″.

They are thoroughly satisfied!



48-S Telsmith Standard Gyrasphere in Kosmos Portland Cement Co. plant at Kosmosdale, Kentucky.

The Kosmos Portland Cement Co. has operated their Telsmith 48-S Gyrasphere 24 hours a day since July, 1951—crushing 100 tons per hour of 220 to 275-degree limestone from 4 1/2″ down to 5/8″.

They are thoroughly satisfied!

Send for Bulletin No. 274

Y-13

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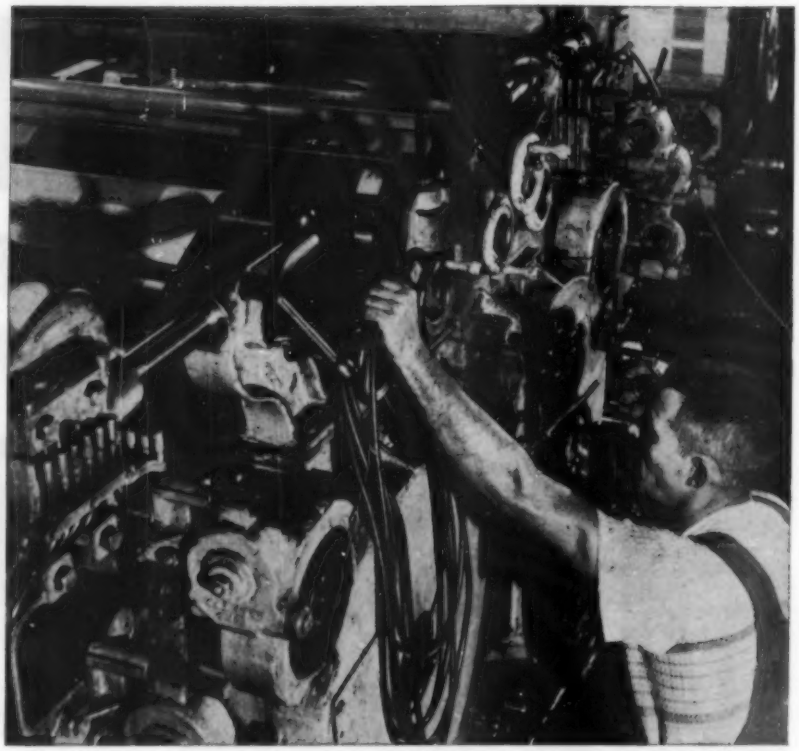
No. 3 of a series

How Bemis makes GOOD multiwall bags for you



As with other types of printing, there is no substitute for experience in multiwall paper bag printing. A typical Bemis pressman is Wesley Pitcher, shown here at the 4-color press he operates at the Bemis plant in Peoria. Wesley went to work in the printing department 21 years ago and has been a pressman for 18 years.

Good bag printing requires *three* things . . . and Bemis has 'em!

Good multiwall bag printing . . . the kind that makes your brand a star salesman . . . requires good presses, good plates and good workmen. *And Bemis has 'em!*

1. Specially designed presses . . . with features needed for *best multiwall printing* . . . are used.

2. Our own skilled, experienced plate makers make our printing plates . . . so we control quality every inch of the way.

3. Since we have been making and printing quality multiwalls for twenty-seven years, we have trained our pressmen to the point that they do, day in and day out, the best printing in the bag industry.

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BEMIS BRO. BAG COMPANY

®

"Here's Good News for us Blasters..."

We have always claimed that Primacord is not affected by stray currents and cannot be set off by friction, sparks or ordinary shock. But lightning! . . . no one knew what lightning would do . . . until now!

The incident took place on a pipe line job in Kentucky. Primacord branch lines were hooked up to the trunk, but the detonator had not been attached. The crew left the job when the thunderstorm warning came — and when they returned they discovered that lightning had struck the Primacord in two places, but had failed to detonate it. About six feet of trunk line was gone, and the free ends appeared to have been melted off. The branch line Primacord from four holes, previously tied into the trunk, were also burned off to the collars of the holes. Another burned out section of the trunk line, about two feet long, was found twelve feet away.

New lengths of Primacord were tied onto the trunk and branch lines, and the blast was shot when all was ready.

This is good news for blasters — especially during the thunderstorm season, or where high voltage electrical equipment is on the job.

P-16

Ask your explosives supplier or write for further facts to

THE ENSIGN-BICKFORD COMPANY
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Also Safety Fuse since 1836

PRIMACORD® *detonating fuse*

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SMOOTHS WINTER OUT OF HAUL ROADS AT ⅓ THE COST OF LARGE GRADERS

Haul roads take a real beating—especially during the winter months. Frost boils, ruts, excessive breakup — all need urgent attention before roads can efficiently handle spring's increasing traffic.

The Allis-Chalmers Model D is tailor-made for haul road maintenance . . . yet with all its capacity to do outstanding work on large or small jobs, this versatile machine costs only one-third as much as a larger grader.

With powerful 50 brake hp. engine backed by sure-footed tandem, the Model D with ROLL-AWAY moldboard blades faster, smoother and easier — on grading and leveling, ditching and sloping, and other maintenance jobs. Its compact design allows it to keep working when trucks pass — no need to pull off the road.

For handling a variety of year-round jobs, the Model D has easily mounted attachments — hydraulic rear-end loader, scarifier, snowplow and windrow eliminator. In addition, power circle turn and leaning front wheel are also available as optional equipment.

The full story and a demonstration of the versatile Model D awaits you at your Allis-Chalmers dealer. See him soon.

Weight — 8,800 lb. (bare)
Brake hp. — 50
Speeds — four forward to 25.6 mph.
reverse to 3.3 mph.

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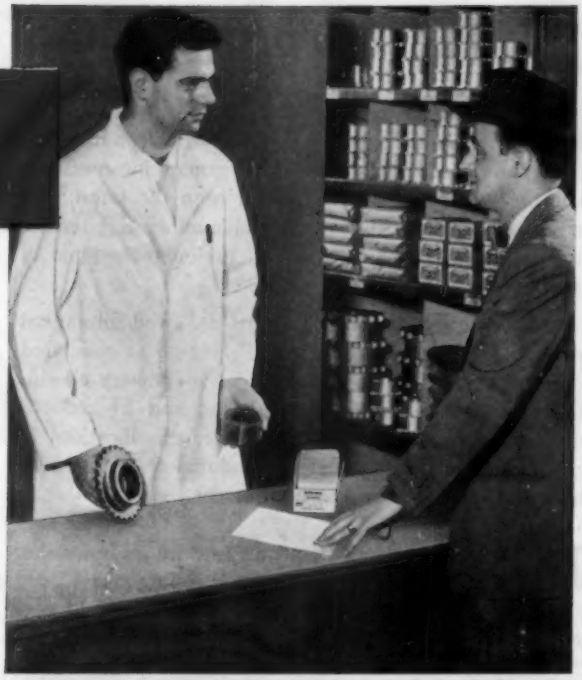
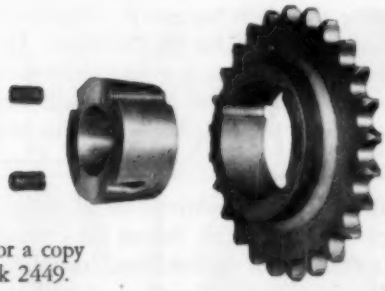
Use Link-Belt roller chain sprockets with taper lock bushings



Faster, less expensive procurement!

There's no delay for reboring when you need sprockets in a hurry. You can pick these *right off the shelf.* Stocks include sizes for single width chains from RC-40 through RC-160.



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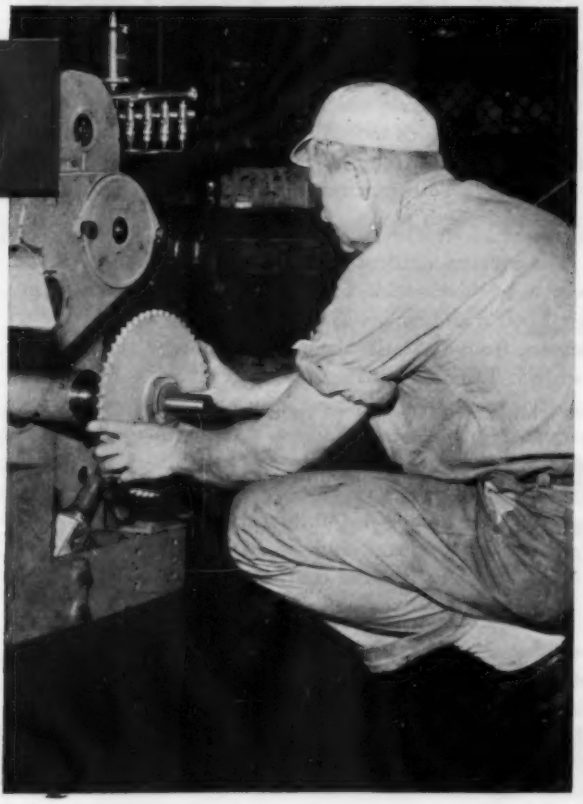
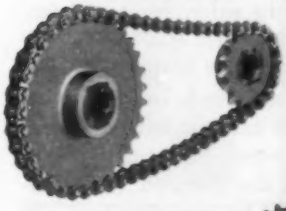


Faster, less expensive installation and removal!

No need to fit sprocket to shaft. Setscrews draw sprocket onto taper bushing, causing bushing to clamp tightly on shaft — equivalent to shrink fit. Turning setscrews in removal-holes quickly releases sprocket from shaft. Full bushing length supports sprocket on shaft.



AN IDEAL COMBINATION: Link-Belt Precision Steel Roller Chain and Link-Belt Sprockets

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13.507

editorial

1953 A Record Safety Year for Some Producers

ACCORDING to the advance report of the National Safety Council, the accident record of member companies in 1953 showed a sharp general improvement over the previous year, which had been the safest year on record. Members in the nonmetallic minerals industries also cut their accident rates, and undoubtedly some of these industries had record years.

The accident rates for all industries showed substantial reductions, in both frequency and severity, as compared with 1952. Thirty-four of the 40 basic industry classifications reduced their frequency rates, and 24 reduced their severity rates. Each of the three classifications in which the nonmetallic minerals industries are included showed sharp reductions in both categories.

THE average accident frequency rate for all industries, based on the number of disabling injuries per 1,000,000 man-hours, was 7.44 in 1953—a reduction of 11 percent from the year before. In the cement industry the frequency rate was 3.81, a decrease of 18 percent from 1952. The rate in the quarrying industry was 14.93, a decrease of 3 percent. Mining, other than coal, which includes many nonmetallic mineral operations, had a frequency rate of 22.95, which was 7 percent lower than in 1952. These records moved cement up from sixth to fifth place among the 40 industry classifications; quarries moved from 36th to 34th place, and mining (other than coal) remained in 38th place.

The average accident severity rate for all industries reporting to the Council, based on the number of days lost per 1,000 man-hours, was 0.83 in 1953—a decrease of 6 percent from 1952. In the cement industry the severity rate was 1.61, a decrease of 30 percent from 1952. The quarrying industry, which now includes sand and gravel, had a severity rate of 2.62, a decrease of 46 percent. Mining (other than underground coal) had a rate of 3.14 in 1953, a decrease of 22 percent. This kept cement in 35th place among the 40 industry classifications; quarrying moved up from 39th to 37th place, and mining (other than underground coal) stayed in 38th place.

For many years we have on this page been praising or berating those companies in this field who are members of the National Safety Council for a better or worse accident record, as the case may be. We have partially lost sight of the fact that these companies are actively promoting safety in their operations, as is evidenced by their payment of membership dues. Their safety record is undoubtedly far better than that of non-member companies in this field—although this cannot be proved, due to the dearth of data on non-members.

WE are not promoting members for the National Safety Council nor the several associations in this field which conduct contests for their members or their industries. We are, however, trying to make every producer realize that it is his moral obligation to provide safe working conditions for his employees. The best way to provide such conditions is to join an organization that will help to promote safety and that will suggest safety measures proved by wide experience to be the most effective.

In addition to an employer's moral obligation to his employees there are selfish reasons for promoting safety. Accidents cost money in lost time, inefficiency, etc. An unsafe plant is also an inefficient plant, and any real steps to reduce hazards must inevitably improve efficiency. A bad plant also suffers from high turnover and low morale among its employees and this is expensive. Such an operation usually does not have the good will of the community in which it operates; it will also pay the highest insurance rates in the industry.

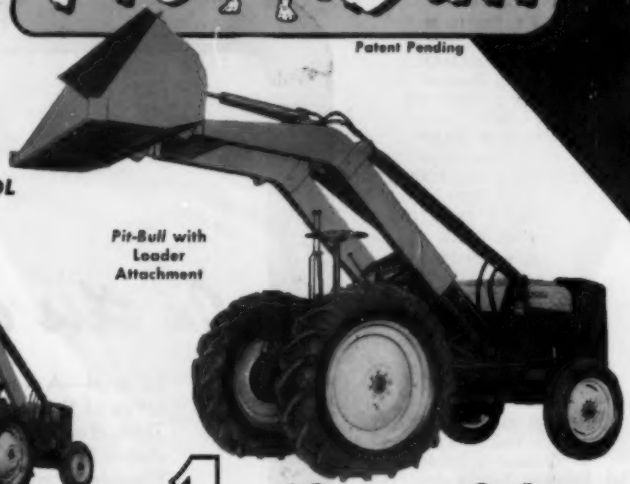
FINALLY, it is becoming more and more obvious that if producers, their industries or associations, do not make much more intensive efforts to promote safety than they are now doing, the entire matter will be taken out of their hands. The worst thing that could happen would be for labor unions to take over the enforcement of safety measures. There are several very sound reasons why this should not be allowed to happen. One is that large segments of our industry are not unionized, and any union efforts would still not affect the entire industry. It is far more likely that the Federal Government would step in; steps have already been taken in that direction. We strongly urge *every* producer to analyze his own operations and to then take all necessary steps to reduce accident hazards.

Walter E. Trauffer

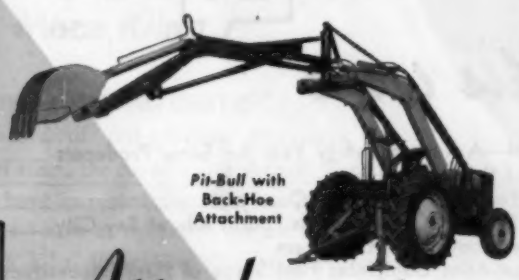
New! The Davis Pit Bull

Patent Pending

- MOUNTS ON REAR OF FORD OR FERGUSON TRACTORS
- FOUR SPEEDS EACH DIRECTION
- INSTANT REVERSING
- CLEAR VISION . . . PERFECT CONTROL
- HIGH QUALITY . . . LESS COST!



Pit-Bull with Loader Attachment



Pit-Bull with Back-Hoe Attachment

11 Attachments . . . to 1 Basic Unit

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Roller Attachment

Rotary Broom Attachment

Dozer Attachment

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Model 100 Front End Loader

REPLACES HIGH-INVENTORY EQUIPMENT

Here's the profitable answer to high-cost equipment. It's the Davis ***Pit-Bull***, a top-quality hydraulic basic unit with eleven easy-to-change attachments designed for greater versatility, maneuverability, visibility and performance at only a fraction of the cost of conventional equipment. The ***Pit-Bull*** completely converts your Ford or Ferguson tractor into a powerful industrial unit with all attachments designed and closely coordinated with the basic unit to make changeovers quick and easy. You buy only the attachments you need. Cab is available as extra equipment. A syncro-mesh transmission gives you four speeds in each direction *plus* extra power for digging and loading, and also permits you to change directions instantly without shifting gears. The steering mechanism and seat arrangement, *plus* easy-to-handle control levers, allow the operator to be comfortable and have clear vision with finger-tip control of both the tractor and ***Pit-Bull*** at all times. It's a quality performer with an eye for profit!

MORE JOBS WITH LESS MEN AND MACHINERY

The Davis ***Pit-Bull*** is a payroll saver, too. It's strictly a one-man machine that's always on the go! When it's not digging, it can be loading, trenching, sweeping, or on any of a dozen jobs . . . the attachments are so easy to change there's little time lost in getting on to another job. Compare ***Pit-Bull***, pound for pound, dollar for dollar; you'll see why it's called the high-quality unit that replaces high-inventory equipment. *Ask for a demonstration.*

The Davis Pit-Bull is manufactured by the makers of the Davis Model 100 Loader, America's quality front-end tractor loader.

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VOL. 47 JULY 1954 No. 1

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APPROVED

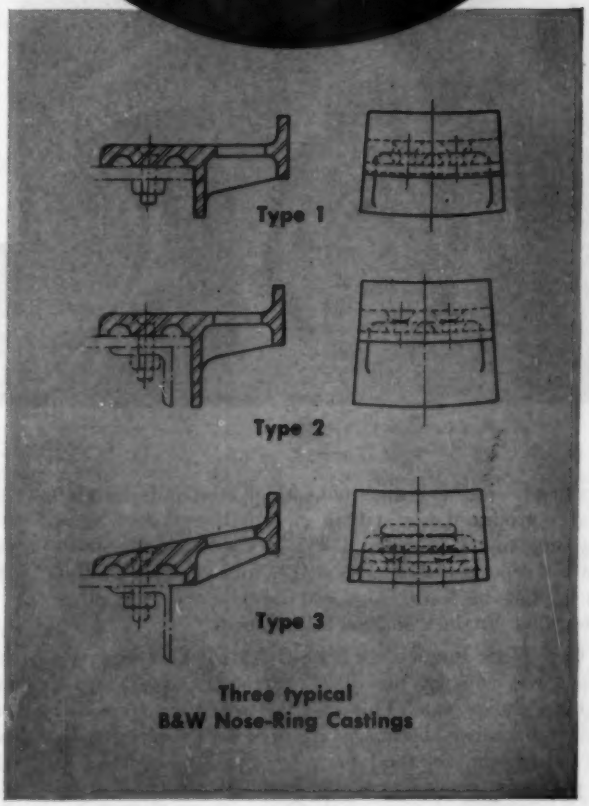
in PUNISHING SERVICE

...by More Plants for More Kilns

B&W ALLOY NOSE-RING CASTINGS are establishing a record of fast-growing acceptance by cement plants across the country and abroad. Recent installations have increased the total to 189 sets—or 7062 pieces—now in operation on the discharge end of rotary kilns in leading cement, lime, and dolomite plants.

Sparking this acceptance trend are important cost-saving features characteristic of these light and strong B&W Castings, resulting in improved kiln performance. These features include:

- Longer brick life and continuous operation by elimination of kiln shell "belling."
- "Feathering-down" of end of kiln shell due to oxidation is overcome, since shell is protected from direct flame.
- Low installation cost, due to small size and light weight of B&W Castings.
- Protective flange on casting permits use of low-alloy steel bolts.
- Spare part inventory reduced as same casting will fit kilns varying up to two feet in diameter.

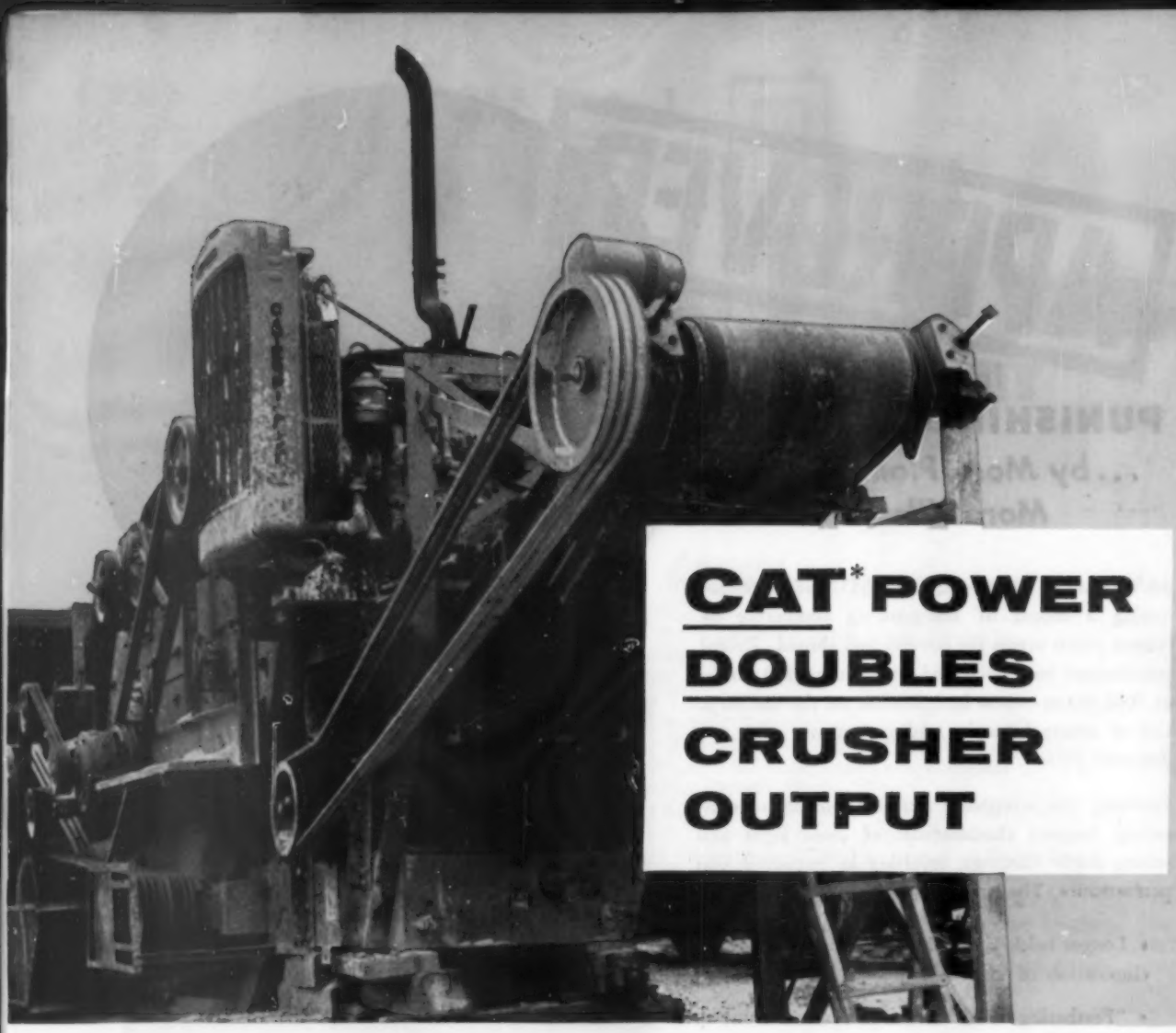


Three typical
B&W Nose-Ring Castings

Write for Bulletin SDM-12.
The Babcock & Wilcox Company,
Process Equipment Dept.,
Barberton, Obio.

BABCOCK & WILCOX

S-420



CAT* POWER DOUBLES CRUSHER OUTPUT

With an engine of another make, this Cedarapids portable crusher produced just a little over half capacity. Since switching to a Caterpillar D337, Ervin Clark Construction Co. reports *full capacity* of 100 tons per hour on this job at Logan, Iowa. Also on the job are four other Caterpillar Engines and an HT4 Shovel.

Caterpillar Engines are honestly rated. You get every horsepower you pay for—*at the flywheel*, and not on an engineer's slide rule. This is vital to high output and efficient operation, because you can be sure you're getting the right engine for the job.

Ervin Clark, owner of Clark Construction Co., reports that he has never had any trouble with his Caterpillar Engines. They run cheaper and longer than his former power. He especially likes their ease of starting by means of a gasoline starting engine, which preconditions the diesel.

Long work life and low down time are built into every Caterpillar Engine by such features as wear-resisting aluminum-alloy bearings and pistons, "Hi-Electro" hardened crankshaft journals, and Caterpillar's famed precision workmanship. Especially important on dusty jobs around rock are Caterpillar's really *effective* engine filters and seals, designed to keep lubricants *in* and harmful grit *out*. And Caterpillar's special fuel-injection system means full and *foul-free* power on low-cost No. 2 furnace oil.

Your Caterpillar Dealer—who offers fast, skilled service and genuine factory parts—will help you select the right engine or electric set for *your* job. There are 12 sizes, up to 500 HP and 315 KW. Leading manufacturers can supply Caterpillar power with their crushers, shovels, compressors and other rock-working machinery. Be sure to specify Caterpillar when you order new equipment, or repower.

Caterpillar Tractor Co., Peoria, Illinois, U.S.A.

CATERPILLAR*

*Both Cat and Caterpillar are registered trademarks—®

SPECIFY CAT POWER FOR HIGH-PROFIT PERFORMANCE

news of the industry

PIT AND QUARRY

Halliburton Now Plans To Erect Two Plants Connected by Pipeline

Erle P. Halliburton, Halliburton Portland Cement Co., Corpus Christi, Tex., is planning to construct two new cement plants in Arizona—one at Phoenix and one at Clarkdale. The latter plant will also supply ground limestone to the Phoenix installation, limestone being pumped through a 110-mile pipeline. Each plant will have a 2,500-bbl. capacity.

It is expected that the first kiln (a 450-ft. long unit) will be built at Phoenix in order to take advantage of the large market created by the building boom in southern Arizona. An equally heavy demand is foreseen for northern Arizona, especially if Congress makes an appropriation for the proposed Glen Canyon Dam in the Colorado River.

At Clarkdale construction of the $5,000,000 plant will begin by the end of summer. A 17.9 mile gasline for supplying gas used in burning will be laid across the Black Hills to connect with the El Paso Natural Gas Company's network in the Chino Valley north of Prescott. From 400 to 500 men will be employed at Clarkdale (in the cement plant and crushed stone plant.) The 110-in. pipeline is expected to cost about $4,500,000.

Arizona Portland Cement To Add Kiln at Rillito

Arizona Portland Cement Company's long-range plan for expansion of its production at the Rillito plant from 4,000 to 7,000 bbl. a day now calls for delivery by October 1 of a kiln to make the increase possible. E. E. Duque, company president, in announcing the delivery date, said an order for the kiln already has been placed. The entire major expansion move will be completed by October 1, 1955.

The Rillito production will jump to 2,500,000 bbl. of cement a year under the new plan. This exceeds the total annual Arizona consumption.

Initial report of the 4,000 to 7,000 bbl. jump at the $3,000,000 plant was issued last April. At that time, geologists estimated limestone and shale deposits near Rillito are sufficient to provide material for 50 to 100 years.

Coming Events

July 22-23, 1954—Hot Springs, Va. Directors' meeting, National Crushed Stone Association. The Homestead.

August 25-26, 1954 — Murray Bay, Quebec. Directors' meetings, National Sand and Gravel Association and National Ready Mixed Concrete Association. Manoir Richelieu.

September 20-24, 1954 — San Francisco. Annual Metal and Nonmetallic Mining Convention and Exposition, American Mining Congress. Civic Auditorium.

October 18-22, 1954—Chicago. 42nd National Safety Congress and Exposition. Conrad Hilton, Congress, Morrison, LaSalle, and Palmer House hotels.

October 20-22, 1954 — New York. Fall meeting, National Industrial Sand Association. Hotel Plaza.

Nat'l Gypsum Reopens Plant at Savannah, Ga. After Major Expansion

National Gypsum Company's plant at Savannah, Ga., has been reopened after a week's shut-down to allow a switchover in the new drying operations, the last phase of a $1,000,000 expansion program which will increase plant production about 25 percent, according to Jack Burns, plant manager.

Production of this plant, which was established in May, 1939, has been increased almost half a dozen times; and it employs 225 people. About 35 freighters are brought to Savannah by the firm each year between June and December to discharge gypsum rock from Dingwall, Nova Scotia. A considerable increase in this tonnage is expected in 1954.

Texas Industries to Market Holiday Hill Stone in S.W.

Texas Industries, Inc., Dallas, has acquired Southwestern marketing rights to Holiday Hill Stone from Burney & Felder, Inc., of San Antonio, Ralph B. Rogers, T.I.I. president, has announced.

"Holiday Hill Stone will be marketed through our subsidiary Texcrete companies in Texas, Louisiana, and Oklahoma," Mr. Rogers stated. The San Antonio firm placed Holiday Hill on the market approximately five years ago.

A. J. Lindquist, associated for 15 years with the McDonald Engineering Co. and formerly in charge of the Western office of the Nicholson Company, has established his own engineering firm at 38 S. Dearborn St., Chicago. Mr. Lindquist will specialize in both the designing and detailing of cement mills, crushed stone, and sand and gravel plants, handling new construction, remodeling, enlargements, or process changes.

Mexican Cement Producers Seek to Stimulate Demand, Make Expansion Plans

Production of cement in Mexico totalled 9,213,000 bbl. in 1953, compared with 9,036,000 bbl. in 1952. This was nearly three times as great as the 1942 production. During and shortly after World War II a rapid rise in demand resulted in relatively heavy importations of cement, but plant capacities had also increased rapidly, and since 1948 annual imports have not exceeded 275,000 barrels. The expansion of existing plants and the addition of new plants, however, was carried out at a rate greater than the rate of increase in consumption. In 1951, plants having a total capacity of 12,000,000 bbl. per year produced at 80 percent of capacity. In 1953, the 17 plants operating in the country had total rated capacity of 13,000,000 bbl., but produced only 9,000,000 bbl., or 69 percent of capacity. This indicates that there is an apparent excess of cement capacity for which the Mexican producers are seeking to stimulate a demand.

The following additions to existing plants are planned:

Cementos Portland Nacional, Hermosillo: one new kiln and allied equipment to increase production by 1,650 bbl. daily.

Cementos Anahuac, Barrietos: two new kilns and allied equipment to increase production by 2,200 bbl. daily.

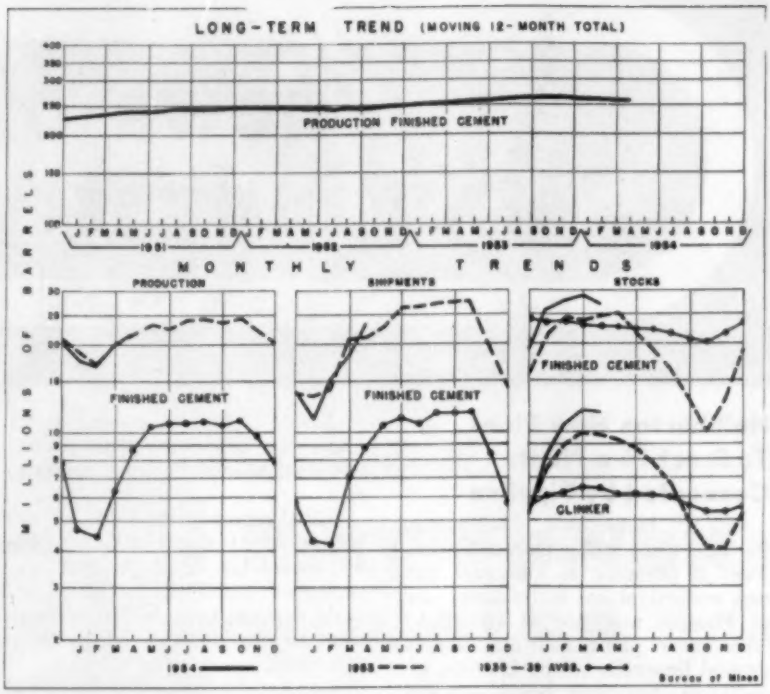
Cementos Atoyac, Puebla: added facilities to increase production by 550 bbl. daily.

Cementos de Chihuahua: one kiln and allied equipment to increase production by 1,100 bbl. daily.

Cementos Portland Moctezuma, Cuernavaca: one new kiln and allied equipment to increase production by 1,650 bbl. daily.

Compania Mexicana de Cemento Portland Apasco: one new kiln and allied equipment to increase production by 1,650 bbl. daily.

These additions, if carried out, will raise total capacity to over 16,000,000 bbl. annually. It appears that the capacities listed may be somewhat in excess of true capacity. During 1952, capacity in excess of 12,000,000 bbl. existed, yet during a large pare of the year there was a cement shortage in the Mexican market. During the same year, however, production totalled 9,000,000 bbl., or only 75 percent of capacity. Regardless of the question of capacity, it is believed domestic plants are capable of meeting present Mexican demand for cement.



SUMMARY—Production of finished portland cement in April, 1954, as reported to the U.S. Bureau of Mines, totaled 21,709,000 barrels—about 0.5 percent less than in April, 1953. Mill shipments totaled 23,567,000 barrels—13 percent more than in the preceding April—while stocks of 27,045,000 barrels of finished portland cement on hand at the end of the month were 9 percent higher than those on hand April 30, 1953. Clinker production during the month amounted to 21,593,000 barrels—1 percent less than clinker production in April, 1953.

PRODUCTION—One hundred and fifty-six (156) plants located in 37 states and Puerto Rico reported production of 21,709,000 barrels of finished portland cement during the month, compared to 155 plants which manufactured 21,802,000 barrels during the month of April, 1953. Clinker production during the month was 21,593,000 barrels, compared to 21,709,000 barrels in April, 1953. Cumulative reports for the first four months of 1954 show that production and shipments of portland cement are 2 percent and 1 percent lower, respectively, than in the first four months of 1953.

SHIPMENTS—Mill shipments of finished portland cement totaled 23,567,000 barrels, 13 percent more than in the same month of the previous year. Shipments were higher in 16 districts and lower in 4 districts, compared to shipments in April, 1953. Largest percentage gains were in Iowa and Kansas, which were up 52 percent and 39 percent, respectively. Nine other districts showed gains in excess of 10 percent. Major decreases were recorded in the northern California and Puerto Rico districts. Cumulative figures show that the major decreases in mill shipments in the first four months of 1954 occurred in the western Pennsylvania-West Virginia, northern California, and Tennessee districts, with several districts showing increases of 5 to 7 percent.

STOCKS—Mill stocks of 27,045,000 barrels of finished portland cement were on hand April 30, 1954—9 percent more than at the end of April, 1953—while stocks of clinker totaled 11,790,000 barrels—21 percent higher than on the same date a year ago.

Canadian Group to Build Cement Plant in Pakistan

Shipments of major components of a $5,000,000 cement plant to Pakistan marked the start of the first project of this type planned by five Canadian firms, which have joined in an enterprise named Canadian Overseas Projects, Ltd. The initial parts include ten 12-ft. dia. by 25-ft. sections of the long, steel shell of the cement kiln, weighing a total of 1,200 tons. These were furnished by Dominion Bridge Company, Montreal, one of the five firms forming C.O.P.L. Other members include the Dominion Engineering Works, supplying mobile mechanical shovels; Canadian General Electric Company, supplying electrical equipment; Fraser-Brace Engineering Company, controlling field construction and installation; and H. G. Acres & Company, consulting engineers on the entire work.

C.O.P.L. was set up to answer the need for a single Canadian firm which could undertake complete projects, from preliminary plans to finished job, anywhere in the world.

In addition, there are many others which serve as suppliers, furnishing a wide variety of machinery and equipment required for the completion of an entire plant.

Nebraska Aglime Producer Hold Meeting at Lincoln—Form State Association

Representatives of the agricultural limestone industry in Nebraska, numbering 42, met on May 20 in Lincoln to form a state association.

Elected to serve as officers of the new organization were the following: W. O. Tilford, General Rock, Inc., Omaha, president; Guy Clements Sr., Olson Quarries, Weeping Water, vice-president; Raymond Hopper, Hopper Bros. Quarries, Pawnee City, secretary-treasurer. President Tilford appointed A. E. Richardson, Nelson Quarries, Inc., Auburn, and J. R. Kenner, Thayer County Lime Quarries, Hebron, to serve as a committee with the officers for the purpose of drawing up by-laws for the new association.

At the second meeting, to be held in the near future, the group will invite the Nebraska ASC Committee and their advisors to meet with them. The May meeting was attended by Robert M. Koch, executive secretary of the N.A.L.I.

Ohio Hydrate & Supply Co. Changes Name to Ohio Lime Co.

According to word from the headquarters of the former Ohio Hydrate & Supply Company, Woodville, Ohio, the new official name of this firm is now the Ohio Lime Company. Products of the company, which operates two plants, include crushed dolomite, crushed limestone, lime, refractory dolomite, etc.

Frank Witmer, sales manager, states that the change of name does not affect the operation of the business. Other officers of the concern are as follows: Fred Witmer, president and general manager; E. J. Nieman, vice-president; E. H. Mauntler, secretary; L. E. Snyder, treasurer and assistant secretary; A. H. Nieman, chemist; Robert F. Rieman, assistant sales manager and traffic manager; and Fred D. Witmer Jr., engineer and purchasing agent.

Rock, Mineral Field Guide Serves Novice, Professional

A Field Guide to Rocks and Minerals by Frederick H. Pough, a handbook written for both the amateur and the professional, stresses immediate identification of mineral specimens in the field. Chapters on crystallography and mineral environments provide the basis for proper visual identification.

There are 254 illustrations, 72 in color, and "almost every mineral which the non-specialist is likely to encounter is described in detail". One inside cover of the book shows a map of the major geological formations of North America; the other is a schematic geologic cross section showing the conditions under which various minerals occur in nature.

Part I, entitled "An Introduction to the Study of Rocks and Minerals", covers the following topics: mineral collection; where to find specimens; physical properties of minerals; crystal classifications; chemical classification of minerals; and tests, techniques, and tips. Part II is devoted to mineral descriptions. Published by Houghton Mifflin Company, Boston. Price, $3.75 per copy.

Pit and Quarry Welcomes R. L. Peck to Editorial Staff

PIT AND QUARRY welcomes Roy L. Peck as the newest member of its editorial staff. Over the past five or six years Mr. Peck has travelled from one end of the country to the other in his work, mainly visiting concrete

Roy L. Peck

products plants, ready-mixed concrete plants, pits and quarries of every description—any places using construction equipment. From 1949 to 1952 he was eastern sales manager of Cook Brothers Equipment Company of Los Angeles, engaged in installing dealerships and promoting the distribution of truck mixers and other equipment. For the past two years he did similar work, as product manager, in the Construction Machinery Division of Chain Belt Company of Milwaukee. He made up his mind recently he wanted to return to the work he always liked best, writing. We feel he has the benefit of a broad field of experience in his background of over 25 years in varied phases of the construction industry.

Following his graduation from the University of Illinois, with the degree of Bachelor of Science in Civil Engineering in 1920, Mr. Peck spent several years in "gaining engineering experience", first with the Illinois State Highway Department in design, survey, and construction. Four years of training next followed with the Portland Cement Association, as engineer in the Cement Products and Structural Bureaus in Chicago. For two years he was in charge of concrete testing with the Pittsburgh Testing Laboratory, and for five years in technical sales and mill construction for the Marquette Cement Manufacturing Company.

Use of lightweight aggregates was increasing in 1935, and Mr. Peck joined one of the major producers, the Western Brick Company, being in charge of the Haydite Division of that company until their Chicago operations were suspended in late 1941 by the advent of war. In connection with this work Mr. Peck acted as secretary of the National Concrete Masonry Association for several years and is now one of the two honorary members of that organization.

He entered the Air Force in 1941, prior to Pearl Harbor, and was in charge as resident representative at the General Motors Corporation plant at Cleveland, on B-29 airplane procurement, and later in Germany with our Strategic Bombing Survey as Lt. Col., U.S.A.F., on evaluation of bombing effects on structures. He returned to this country in 1946 and re-entered the construction equipment field he knew so well.

Mr. Peck has made a host of friends in his long career. He is a member of Phi Kappa Sigma and Theta Tau (Engineering) fraternities, and over various periods has had membership in the American Concrete Institute, Association of Engineers, and other similar groups, frequently contributing articles of current interest, perhaps the initial one being his A.C.I. paper on the disastrous Florida hurricane of 1927. We feel that Mr. Peck can draw effectively on his many years of varied contacts in the construction and its allied fields, in presenting various phases of his future work with this publication.

Multimillion-Dollar Project Announced by Lehigh For Expansion at Bunnell

The Lehigh Portland Cement Company's recently announced multimillion-dollar expansion program at Bunnell, Fla., will increase production 80 percent over present capacity, according to Joseph S. Young, president of the company. Provision will be made for additional expansion to keep pace with Florida's growth, Mr. Young stated. Construction is expected to be completed by the summer of 1955.

The original plant, completed only two years ago at a cost of $15,000,000, is said to be one of the most modern on the continent for the manufacture of top-quality portland cement. An extensive deposit of coquina shell in that area supplies raw material. When the expansion project is completed, the plant reportedly will be one of the largest in the country.

Japanese Return to Okinawa With New Cement Plant Unit

A 4,500-ton cement storage tank, with combined packing unit, has been constructed on Okinawa by the Onoda Cement Company of Tokyo, under a tieup with a local construction enterprise. This is the first Japanese cement manufacturing concern to set up an overseas branch.

Work on the plant in Tomari, Okinawa, known as the Okinawa Cement Industry Corporation, was started last July. The project is capitalized at 60 million yen ($166,700). The Japanese firm invested 40 percent of this sum, while the remainder was put up by Kokubagumi, an Okinawan construction concern.

Cement in bulk will be shipped by the Onoda Cement's Taukumi plant on Kyushu Island to the new Okinawa unit for storage, bagging, and local distribution.

Irish Cement Plant Doubles Output in Large Expansion

Boasting a 230-ft. prestressed concrete chimney as the highest of its type in the world, the Magheramorne cement plant of the British Portland Cement Manufacturers, Ltd., on Northern Ireland, is soon to be completed. Construction of the plant started over a year ago.

Scheduled capacity of the new plant is to be 6,000 tons (33,000 bbl.) weekly, reportedly making it the largest cement producing plant in Ireland. The previous output of this plant was 3,250 tons (18,000 bbl.) weekly. The $4,000,000 expansion program of the company, of which the Magheramorne plant is a major part, is in line with the current expansions of major cement firms in the British Isles.

Sand-Gravel Firm Executive Goes Places with Jaycees

Dain J. Domich, controller of the Brighton Sand and Gravel Company, Sacramento, Calif., recently retired from his duties as president of the U.S. Junior Chamber of Commerce.

As the son of a restaurateur who emigrated 46 years ago from what is now Yugoslavia, Mr. Domich has had a career which illustrates putting to good use the many opportunities America offers to its people. He was educated in the public schools of Sacramento and took an extension course with the University of California. Service in the Army resulted in his elevation from a private to the rank of captain (1945). Upon his discharge from the armed forces he joined the Brighton Sand and Gravel Company, which produces bituminous aggregates and sand and gravel.

Dain J. Domich

In the same year he joined the Sacramento Junior Chamber of Commerce, in which he soon distinguished himself, winning many honors and citations. He served as president of the local chapter, then as state president, vice-president of the U.S. Junior Chamber of Commerce, and finally president.

Commenting upon his rise in the Brighton Sand and Gravel Company organization, Mr. Domich gave much credit to the Jaycees and the training he received in leadership. He is now one of the three top men in his company.

Paul Lime Plant Installing 2nd Rotary Kiln in Arizona–Adding 80 Tons Daily

The Paul Lime Plant, Paul Spur, Ariz., is now installing its second rotary kiln, a 7½- by 110-ft. unit, which will increase lime production by 80 tons per day. The new kiln is a forced-draft type, contrasted to the older 7- by 160-ft. kiln, which utilizes natural draft. The kiln, shipped in two sections, is being installed by the Tucson Warehouse and Transfer Company.

One of the major reasons for the expansion is the opening of Phelps Dodge's Lavender Pit in Bisbee some time this summer, where the lime will be used in copper flotation.

Leighton, Illinois Survey Chief Retires after Long Career

Dr. M. M. Leighton, chief, Illinois State Geological Survey, has retired from his duties after 31 years in this post and 35 years as a geologist. The announcement was made by the Board of Natural Resources and Conservation of the Department of Registration and Education, State of Illinois.

At the same time the board announced the appointment of Dr. John C. Frye as Dr. Leighton's successor. Dr. Frye was formerly state geologist and executive director, Kansas Geological Survey, and professor of geology at the University of Kansas, Lawrence, Kans.

Largely through Dr. Leighton's efforts, the Illinois Survey has gained a wide reputation, nationally and internationally, in scientific, engineering, and educational fields; and for many years it has been the leading state geological survey in the country. Besides widening the scope of the Survey from field surveys to chemical, spectographic, X-ray and microscopic studies of the many Illinois mineral resources, Dr. Leighton also extended the Survey's services to benefit all of the state's mineral industries, as well as manufacturing, highway, and other projects.

Ohio Gravel Co. Acquires 100-Acres at Camp Dennison

The Ohio Gravel Company of Cincinnati has expanded the acreage of its main plant, Camp Dennison, Ohio, by 50 percent with the purchase of a 100-acre tract adjoining the original property. The price was reportedly about $124,000.

With the combined tracts now owned by the $600,000 Camp Dennison plant, company officials state that the firm has an assured supply of gravel for the next 40 years.

N.Y. Trap Rock Launches Riverama of the Hudson—Show Boat, 1954 Style

"Riverama" — New York Trap Rock Corporation's de-luxe floating barge exhibit at Haverstraw, N. Y. (announced in the May, 1954 issue of PIT AND QUARRY) was the feature at a meeting on May 10 of nearly 1,000 prominent government, civic, and industrial figures, who also visited the company's new $1,000,000 stone crushing facilities there.

Bertram D. Tallamy, chairman, New York State Thruway Authority, delivered the principal address, outlining the work the state had launched in highway construction, as the means of providing unequalled modern highway transportation facilities. Mr. Tallamy also cut a ribbon, symbolically launching the "Riverama" on her summer tour of municipalities along the Hudson River, metropolitan New York, and Long Island Sound exhibition points.

The displays, exhibited in natural effect on the "Riverama," included historic, scenic, and industrial depiction of the part played by Trap Rock in the production of stone materials. Photographs, maps, and working models illustrated accurately the functioning of all the corporation's activities. Modern community life was delineated with miniature railroads, traffic moving along a model of the Thruway, boats in the harbor, and modern schools, shopping centers, office buildings, and other facilities necessary to life today.

New York Trap Rock is one of the country's leading suppliers of stone for construction and repair of streets, roads, and highways. The new plant at Haverstraw will add 20 percent to the company's present 4,000,000-ton annual capacity of stone products, ranging in size from 2½-in. stone down to pulverized limestone. In other quarrying operations sizes include 12-ton pieces used for the construction and protection of seawalls, harbors and piers.

● Dockside view of New York Trap Rock Corporation's floating historical and industrial exhibit, "Riverama", depicting the firm's role in the production of stone materials.

Israel's Third Cement Plant Stimulates Area Development

Shimshon Cement Works recently put in operation at Hartuv, in the Judean Hills region of Israel, a new cement plant which is scheduled to produce 1,375,000 bbl. annually. It is the third cement plant installed in Israel. A tract of 500 acres partially leased, has been acquired for the operation. Some 250 workers will be employed in the plant and many more for the limestone and clay mining operations.

The plant, which represents an investment of over $15,000,000, is favorably located near an unlimited supply of raw materials, sufficient manpower, and good communications through the main Tel Aviv-Jerusalem railway line. It has its own diesel-equipped power station supplying 12,000 hp. The Nesher Cement Works and the Ramle cement plant, the only other cement producers in Israel, have a combined annual capacity of 3,300,000 bbl. of cement.

Cover Picture....

● A scene in the quarry of the Hercules Cement Corporation near Stockerton, Pa., is shown on our cover picture. On the upper level (right) is a well drill for drilling primary blast holes. The large shovel in the foreground is loading quarry run material into a heavy-duty truck fitted with a side-dump body. (See page 76.)

Monolith Portland Cement Co. Expanding California Plant

Increase of plant capacity of more than 1,000,000 bbl. a year is anticipated at the Monolith Portland Cement Company's plant at Monolith, Calif., as the result of the building improvement program currently under way there, W. D. Burnett, executive vice-president, announced recently.

Included among the additions and alterations designed to speed up Monolith's wet-process system are a large slurry drier, a multiclone-type dust collecter, and several additional kilns.

The drier, measuring 103 ft. by 12 ft. in dia. is being installed on an existing kiln, with completion date set for October 1. The dust collector and more kilns will be added later in the year.

International's Bartow Plant Making Uranium Concentrate

Near Bartow, Fla., the International Minerals and Chemical Corporation is producing uranium concentrate as a by-product of phosphate chemicals. Although the proportion of the vital material in phosphate rock is very small, the vast reserves of this rock in the United States make it a highly important potential source of this strategic raw material.

International built the uranium unit, in the middle of a one-acre plot surrounded by a 10-ft. fence, with its own capital, which the Federal Government will permit the company to recover over a 10-year period. It was indicated that the Atomic Energy Commission will pay enough for the uranium to allow the firm to make "a modest profit".

Corps of Engineers Issues Five Volumes of Data On Concrete Aggregates

According to the requirements of the Corps of Engineers, U.S. Army, a survey must be made to determine the properties of aggregates locally and economically available for its various projects. At laboratories in Portland, Oreg., San Francisco, Calif., Dallas, Tex., Omaha, Nebr., Vicksburg, Miss., Atlanta, Ga., and Cincinnati, Ohio, such work is carried on for individual projects by the division concrete laboratory nearest the job site.

Under the Civil Works Investigations Program sponsored by the office of the Chief of Engineers the Waterways Experiment Station at Vicksburg in 1950 began to compile all of the information developed since 1946 in connection with aggregate surveys. At present 1,210 sources of material located within the continental United States have been compiled. These sources are located on 333 different maps (each covering an area one degree in latitude and one degree in longitude) which together take in the entire continental territory.

Five loose-leaf volumes of data have been published and distributed to Corps of Engineers district and division offices and laboratories. These offices furnish the Waterways Experiment Station with additional data as they are developed. Annual supplementary sheets will be issued to keep the record up to date. The director of the Waterways Experiment Station will maintain several complete sets of these volumes, which will be available on a loan basis. It has been indicated that users of these data should consider the information "indicative of the properties of the sample . . . tested, but not necessarily indicative of the properties . . . which may be produced from these sources in the future".

P.C.A. Opens New Offices In Florida and Louisiana

Establishment of two new Portland Cement Association district offices—in Orlando, Fla., and New Orleans, La.—has been announced by C. D. Franks, president of P.C.A. James E. Dunn, former manager of the association's office in Washington, D. C., will be district engineer in charge of the Orlando office. D. L. Chaney has been appointed the new manager in Washington; and Andrew J. Spradlin will take charge of P.C.A. activities in New Orleans.

Mr. Spradlin joined P.C.A. as a field engineer in southern Louisiana in 1941. Prior to that time his experience in the engineering field included positions with architectural firms in New York and with the Department of the Interior.

Mr. Dunn became associated with P.C.A. in 1925 as a field engineer in Tennessee. He is a registered professional engineer, District of Columbia.

Mr. Chaney's service with P.C.A. began in 1928, when he became a field engineer in St. Louis, Mo. Since 1935 he has been regional structural engineer in the Atlanta office.

● Material Service Corporation, Chicago, was recently awarded the National Safety Council's Award of Merit plaque in honor of the company's outstanding 1953 safety record in its large-scale quarrying, sand and gravel, and ready-mix operations. In this view Robert D. Gidel, (4th from left) National Safety Council Safety Engineer presents the plaque to George W. Lenzie, operating vice-president of Material Service Corporation. Looking on are persons who played important roles in winning the award: (left to right) Doug Kirp, assistant director of safety; Lester Crown, vice-president; Mr. Lenzie; Mr. Gidel; George Kirp, general production manager; and Milton Aronstam, director of safety.

In 1953 the company's injury frequency rate was 29 percent lower than the industry "par" rate, and the injury severity rate was 25 percent lower than "par".

● S. Carl Smithwick (left), past president of the Expanded Shale Institute and Warren W. Allen, Hydraulic-Press Brick Co., St. Louis, Mo., newly-elected president of the institute, examining a plaque containing a sample of lightweight concrete taken from the U.S.S. "Selma," which had been exposed to sea water for 34 years. Mr. Allen was elected president of the Institute at its last annual meeting, held April 24 to 27 at Louisville, Ky., the meeting was described in the May, 1954, issue of Pit and Quarry.

Fountain Sand & Gravel Co. Processing Industrial Sand

Installation of a $60,000 sand drying plant at the Fountain Sand & Gravel Company's facilities in Pueblo, Colo., marked the entry of this firm into a new field, that of supplying industrial sand.

Joseph F. Bullen, president, revealed that the new plant was installed after the company had contracted to supply engine sand for the entire system of the Denver & Rio Grande Railroad. Several carloads of the product will be shipped out each week to all division and terminal points. Capacity will be 200 tons per day. Mr. Bullen indicated that the use of sand as a safety measure for transport trucks is also being investigated by the company's staff. Other products of the new plant will be filter, blast, grinding, and abrasive sands.

The firm recently moved from its temporary office location to a new building at the plant site. A fire destroyed the office building and shop in March.

Production of cement in Brazil's 15 cement plants during the first nine months of 1953 totalled 1,466,000 tons (over 8,000,000 bbl.). Eleven more plants are expected to be operating by the end of 1955, when production of cement is estimated will be in excess of 4,000,000 tons (22,000,000 bbl.).

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Do you need a wheeled tractor with power and exceptional lugging ability?

The DW15 is your answer! Its new 150-HP diesel engine is matched to its weight and capacity. Its heavy-duty clutch and transmission match the engine. Engine, clutch and transmission are designed and built by one manufacturer.

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The DW15 is your answer! Designed and built by Caterpillar, it is available with a complete line of matched units . . . scrapers, bottom dump and side dump wagons.

Call your Caterpillar Dealer today. He'll give you complete details on this new high-production, high-speed earthmoving machine. He'll show you the DW15 in action.

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NAME THE DATE... YOUR DEALER WILL DEMONSTRATE

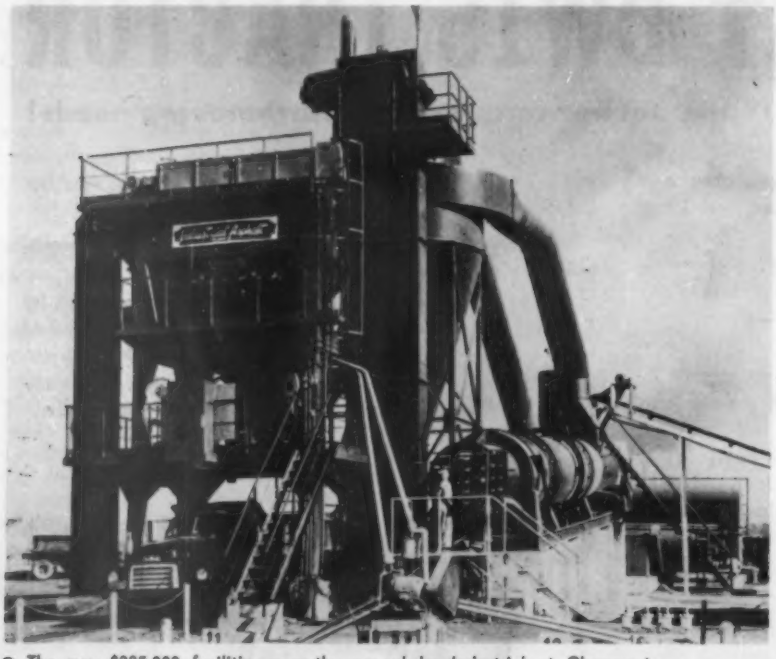
Industrial Asphalt's Plant At Claremont Christened By Cinema's Jeanne Crain

With over 1,500 people in attendance, Industrial Asphalt Company opened its new plant at Claremont, Calif., on April 24. One of the highlights of the affair was the champagne christening of a new Standard Steel asphalt plant by Universal-International film star Jeanne Crain.

The acquisition of this 4000-lb. capacity Standard plant represents the eighth purchased from that company by Industrial Asphalt. The opening of the Claremont plant continues Industrial's program of expansion based on the idea of interlocking locations and the reduction of hauling distance to any job. The company now operates 8 hot-mix plants—three at Sun Valley, three at Irwindale and two at the new Claremont location. Jim LeSage, former public-relations director of the firm, will manage the new installation.

Actual operation of the new hot-mix plant was demonstrated as part of the program. A small section of the site was paved, a Barber-Green spreader and a Buffalo roller doing the actual paving work. Industrial Asphalt is not a contracting firm; it manufactures fine asphaltic materials and, as a service to customers, makes spreaders and rollers available for rent. The demonstration was made to acquaint visitors with Industrial's services.

● Scene at the christening ceremonies at Claremont. Left to right: Jeanne Crain; Jim LeSage, manager of the Claremont plant; Harold Hansen, superintendent of all Industrial Asphalt plants; John Keane, sales manager, Richfield Oil Co.; Robert Mitchell, president, Consolidated Rock Products Co.; Wallace E. Hunt, president, Industrial Asphalt; and M. B. Freeman, vice-president, Standard Steel Corp.



● The new $225,000 facilities recently opened by Industrial at Claremont.

April Building Activity Tops $2,000,000,000 Mark Continuing High Trend

Construction activity continued at record levels in April. Total dollar outlays for new work rose 9 percent to $2,800,000,000, according to preliminary estimates of the U. S. Department of Labor and the U. S. Department of Commerce. The gain was about usual for this time of year, and brought expenditures thus far in 1954 to more than $10,000,000,000, or slightly above the 1953 figure for the first four months.

The March-April rise mainly reflected the usual spring expansion in private residential construction, plus a more-than-seasonal spurt in highway activity. Total private expenditures increased by 7 percent from March to $1,900,000,000 in April, and public outlays rose by 16 percent to $900,000,000. Spending was at peak rates for the month of April on highways, on commercial, religious, and educational (private and public) building, and on public-utility and sewer and water construction.

Private residential building, totaling $956,000,000 in April, was up 10 percent from March and at about the same level as in April, 1953. Commercial building failed to rise seasonally last month, reflecting a decline in contract-award values during the past winter. However, the April, 1954, level was one-third greater than a year ago, and recently advancing award rates indicate that spending for new commercial structures wil rise in May. Private industrial construction, which usually manifests a downward drift in the early part of the year, continued in April to show the less-than-seasonal decline that has been evident since January. Most types of public construction showed a strong uptrend in April.

High Demand, Short Supply Of Lithium Spur Expansion

According to a report from the Bureau of Mines, the lithium industry for the year 1952 was characterized by a shortage of lithium minerals and compounds, but also by an expansion of facilities for mining and processing lithium minerals and manufacturing lithium compounds in anticipation of further increase in requirements.

Shipments of 15,611 short tons of lithium minerals, with an estimated lithia content of 1,088 short tons, was the largest quantity ever shipped from mines in the United States in a single year.

PROVING EXTRAORDINARY SERVICE—A Hercules Flattened Strand crane rope delivered 18 months service, compared to 6 months for ordinary rope. It performed equally well as a clamshell bucket rope. On a hot ladle crane it outlasted round strand rope by 4 to 1, and still tested at higher-than-rated strength. It was chosen for its super strength to haul the car on the continent's largest cableway at Kitimat.

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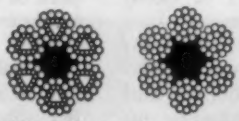

Flattened Strand Round Strand

The key to the difference is the triangular shape of the strands. Notice how the strands support each other; how the rope circumference is almost perfectly round; and how the core is smaller. There is 10% more steel in Hercules Flattened Strand than in round strand ropes of the same diameter. That means *10% more strength* and *10% greater safety*. Flattened Strand wears longer and more evenly . . . and is easier on sheaves and equipment.

If you can use this Super-rope, you'll soon begin saving time, labor, money. Why not investigate?

Because Leschen pioneered and perfected Hercules Flattened Strand wire rope, Leschen is your best source of additional information. Ask your Leschen man, or write for "The Flattened Strand Story."

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Concrete Storage Bins Withstand Fire Damage At Campbell Sons' Corp.

In a disastrous fire the main 36- by 240-ft. main warehouse of the Harry T. Campbell Sons' Corporation at Towson, Md., was destroyed on March 12.

According to B. S. Campbell, president, 700,000 bags stored in the warehouse were destroyed in the blaze, which originated from a spark thrown off by a welding torch. Although the fire was almost under control at one time, a break in the firehose caused the flames to spread through the warehouse and, *via* a conveyor belt, to the main crushing and screening plant.

On the following day, Mr. Campbell reports, the crusher plant was again in operation, and by maintaining a 24-hour, round-the-clock schedule, the personnel was able to send orders out promptly to customers "without losing a ton".

Mr. Campbell adds an interesting sidelight which might be helpful to other plant owners: "I would advise all operators to take a real good look at their insurance policies and make sure, if they have a co-insurance clause in their policies, that they are insured to the limit, because under the present-day appraisal of replacement value, I am quite sure that eight out of ten will find that they are far under-insured, as we were."

● Flames attacking the roof of the main warehouse.

● The grit storage bins, one of which had just collapsed.

● The new building in process of construction and the grit plant.

● The new grit plant, with a corner of the old lime kiln at the right.

New Facilities Being Built By Haitian Cement Firm

Work is in progress on the construction of a cement plant for the firm of Le Ciment d'Haiti at Source Matelas, about 15 miles north of Port-au-Prince, near large deposits of marl. It is expected that the facilities will be completed late this year.

This firm, formed in 1951, was expanded in the following year and is heavily subsidized by Compagnie des Grands Travaux de Marseilles. Haitian investors, particularly the Haitian Bank for Industrial and Agricultural Credit, and Venezuelan private individuals also are backing the venture. Rated capacity of the plant will be 5,000 bags of cement per day.

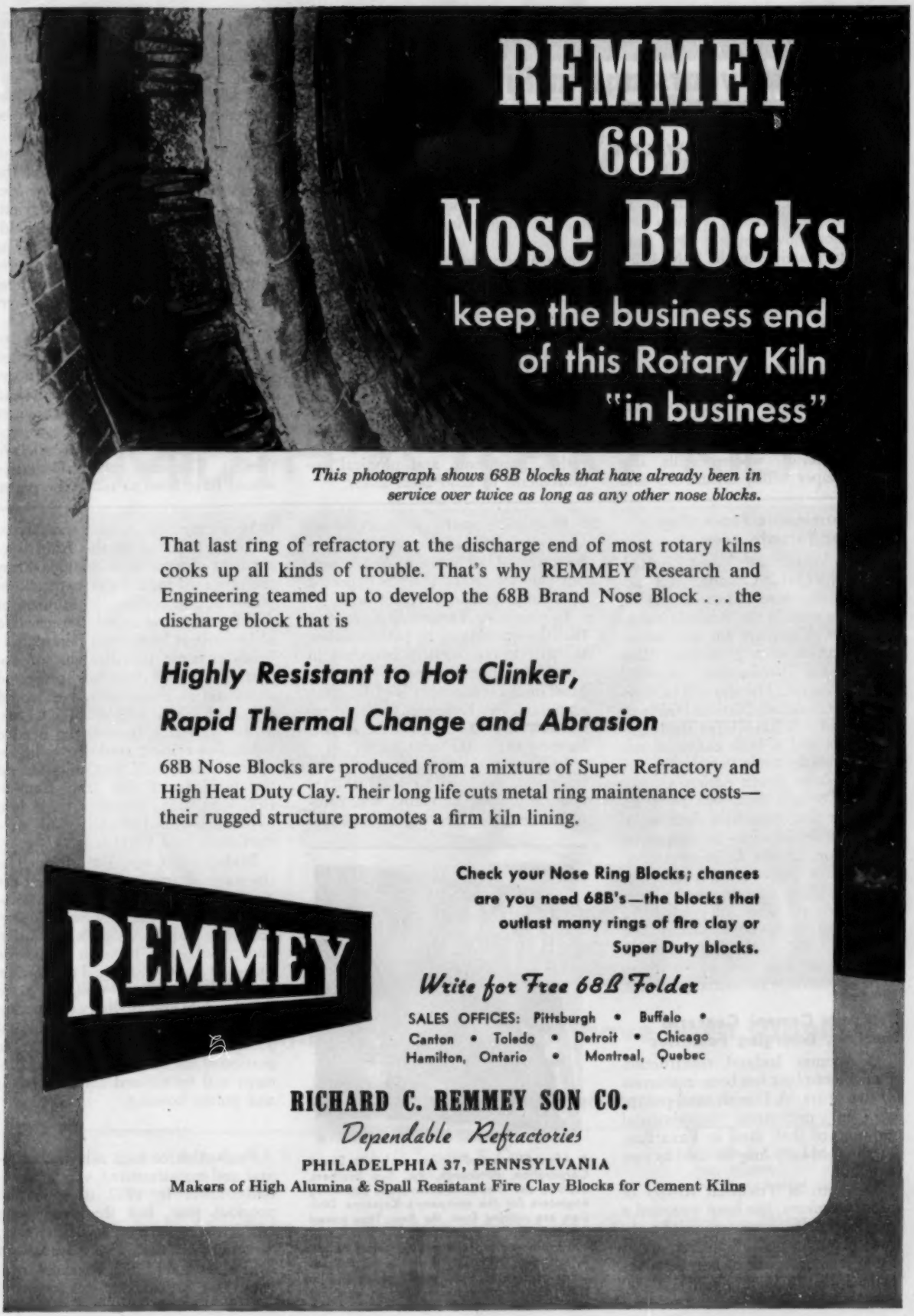
Equipment will include machinery for wet-process manufacturing, using a 150-ton-per-day kiln; storage tanks and pipelines for diesel fuel; a small generating plant; and a 600-ft. wharf.

U. S. Chamber of Commerce Revises Stand on Housing

A new policy urging the construction industry and government to encourage the "fix-up" market as an industry stabilizer and as a means of conserving property values, was adopted by the Chamber of Commerce of the United States.

It has been estimated that probable expenditure for "fix-up" activities is around six billion dollars, and there is a possibility of pushing up the total 30 to 50 percent higher.

The Chamber also revised current policy to emphasize the responsibility of state and local governments in meeting shelter requirements of needy families in housing of acceptable minimum standards. Present policy puts this responsibility on local welfare agencies. The revised policy expresses in broad terms that this responsibility rests with local governments, rather than with the federal government. Likewise, that part of present Chamber policy relating to urban redevelopment is expressed in broader terms of local responsibility. The need for comprehensive city planning for this activity is emphasized.



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This photograph shows 68B blocks that have already been in service over twice as long as any other nose blocks.

That last ring of refractory at the discharge end of most rotary kilns cooks up all kinds of trouble. That's why REMMEY Research and Engineering teamed up to develop the 68B Brand Nose Block . . . the discharge block that is

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68B Nose Blocks are produced from a mixture of Super Refractory and High Heat Duty Clay. Their long life cuts metal ring maintenance costs—their rugged structure promotes a firm kiln lining.

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30 years ago in Pit and Quarry

By WALTER E. TRAUFFER

ONE of the best markets for lime today is in the treatment of trade wastes. That this is not a new application, however, is evident from the feature article in the July, 1924, issue of PIT AND QUARRY. In *Lime in the Treatment of Trade Wastes,* James R. Winthrow, professor of industrial chemistry, Ohio State University, pointed out that lime was first used as a precipitating and coagulating agent about the middle of the 19th century. He described the progress that has been made and the application of this method to waste from tanneries, woolen mills, dye plants, paper mills, creameries and dairies, canneries, starch plants, etc. Mr. Winthrow predicted a growing market for lime for such application.

There were in this issue several more articles by authorities written especially for PIT AND QUARRY. *Elements of Budget Control* were described by D. J. Hutchinson, member of a prominent firm of accountants and auditors. A. H. Findeisen of the Industrial Commission of Wisconsin gave much sound advice in an article entitled *Safety in Quarries Should Have More Attention.* The third article was a discussion of the preparation, gradation, and physical requirements of sand blast sands.

This issue also featured a variety of plant operating articles. One described the new 50-car per day plant of the Midwest Crushed Stone Quarries at Greencastle, Ind., which replaced a smaller plant destroyed by fire.

Another article gave details on the new Rotan, Texas, plant of the Universal Gypsum Co. Also described was the new feldspar grinding plant of the North State Feldspar Corp. at Micaville, N. C. The sand and gravel industry was represented by three articles describing operations of: the Indiana Gravel Co., the Granite Sand & Gravel Co., and the John Jones Co., all at Indianapolis, Ind. The first-mentioned operation featured an unusual recovery method. When the deposit had been exhausted beyond the range of a slackline cableway excavator system a second system was installed to feed it. The only other alternative would have been to move the plant.

New Vermiculite Processing Plant for Toronto Area

Siscoe Vermiculite Mines Limited, Cornwall, Ont., Canada, has acquired a five-acre industrial site on Bethridge road in the Rexdale industrial area. Plans are for the immediate erection of a processing plant with initial production expected early in August. The site will be serviced by Canadian National railway siding and will have large steel storage tanks and a bulk conveyor system to handle crude vermiculite ore received from South Africa.

The Toronto area has been selected for first expansion because of its favorable location for improved distribution to the building trades. Vermiculite lightweight aggregates are used in the concrete and plaster fields and are also job-graded for home insulation, horticultural and fertilizer aids, packaging material, sound deadening, and as an ingredient in countless industrial products.

Overseas Cement Concerns Erecting, Enlarging Facilities

At Akranes, Iceland, construction of a cement plant has been inprogress for two years. A Danish sand-pumping ship performed experimental pumping of shell sand in Faxa Bay, which eventually may be used as raw material.

The firm of Friedrich Krupp of Essen, Germany, has been awarded a contract for the construction of a cement plant for an Indian firm about 450 kilometers south of Bombay. Annual capacity will be about 100,000 metric tons.

Production at the Jordan Cement Company's plant was said to have been started last autumn. Yearly output (at full production) is expected to be approximately 72,000 tons.

Cementos de Tanger, S. A., reports that the opening of its plant marked the first heavy industry launched in the International Zone of Tangier. Most of the equipment is of German manufacture. Estimated yearly production is 50,000 tons, with a possible increase to 100,000 tons.

In Turkey the Sivas cement plant extension, designed to add 100,000 tons of cement annually, was completed last year. New plants were said to be planned for Ankara and Afyon.

Citing a saving to the Iraqi government of more than $6,000,000 by the proposed building of two cement plants in that country, its ministry of development has urged the erection of facilities at Mosul and Kirkuk. Officials estimate that the cost of importing cement for two projected dams and an irrigation system would amount to about $12,480,000, whereas two plants to furnish the needed volume of cement could be built for approximately half that amount. At the facilities of the Iraq Cement Company, Ltd., where a third kiln has been installed recently, daily production is now 1,000 tons.

Malayan Cement, Ltd., formed as the result of an agreement among the Associated Portland Cement Manufacturers, Ltd., the Malayan Collieries, Ltd., and J. A. Russell & Company, Ltd., has been in operation since last summer. Annual production is rated at about 100,000 tons. Another kiln and auxiliary equipment sufficient for doubling the present capacity may be added. A considerable portion of the output of Malayan Cement will be utilized for new roads and public housing.

● After 47 years of service each with Dravo Corporation, Pittsburgh, Pa., two brothers, Sterling and Walter Wilkins, crane operating engineers for the company's Keystone Division, are retiring from the firm. They joined Dravo in 1907 at Broad River, S. C. The Wilkins brothers are proud of their safety record with Dravo. Although they handled thousands of tons of steel, sand, and gravel in their careers, they never had an accident that caused injury to anyone.

Production of soda ash, both natural and manufactured, was substantially lower in 1952 than in the previous year, but the production trend was up at the end of the year, according to the U. S. Bureau of Mines. A total of 323,479 short tons, valued at $7,828,033, was reported for 1952.

PIT AND QUARRY Special

26th ANNUAL CEMENT-MILLS SECTION

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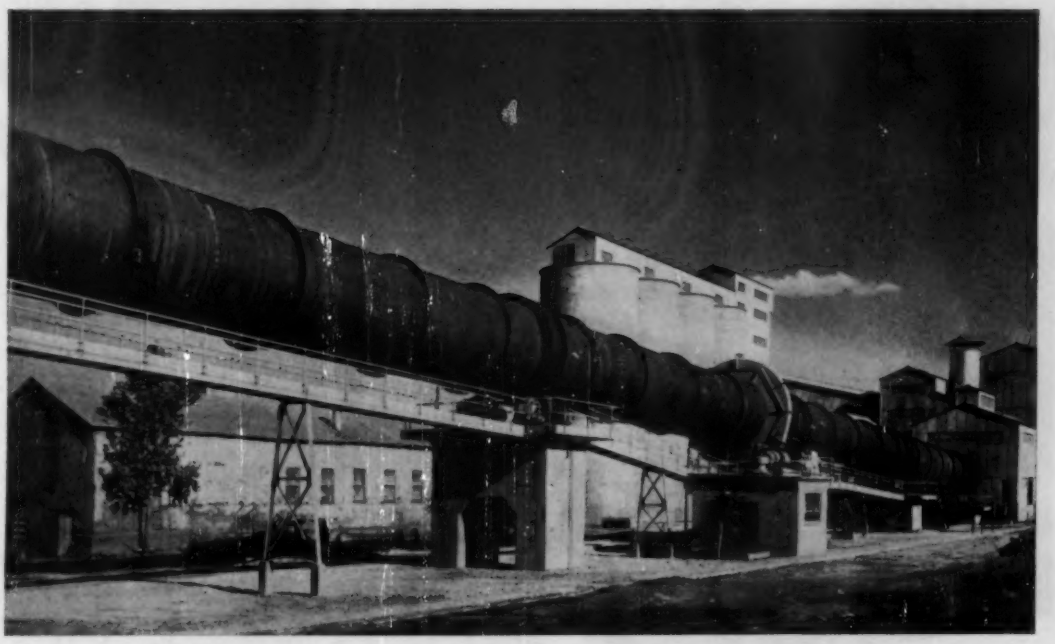

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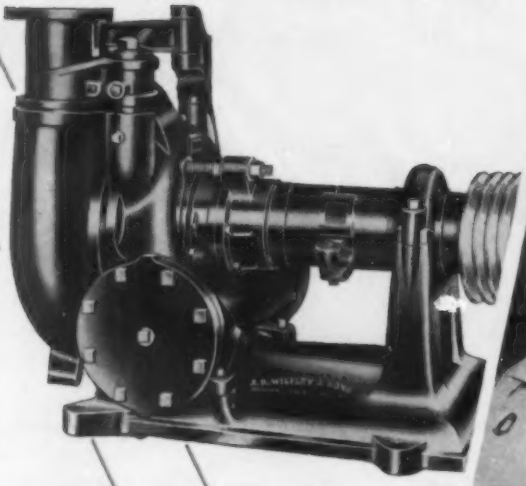

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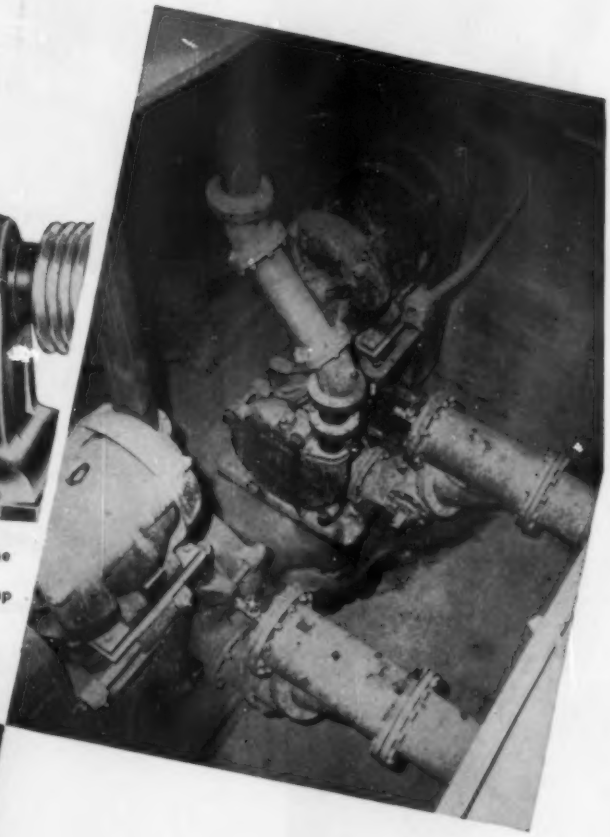

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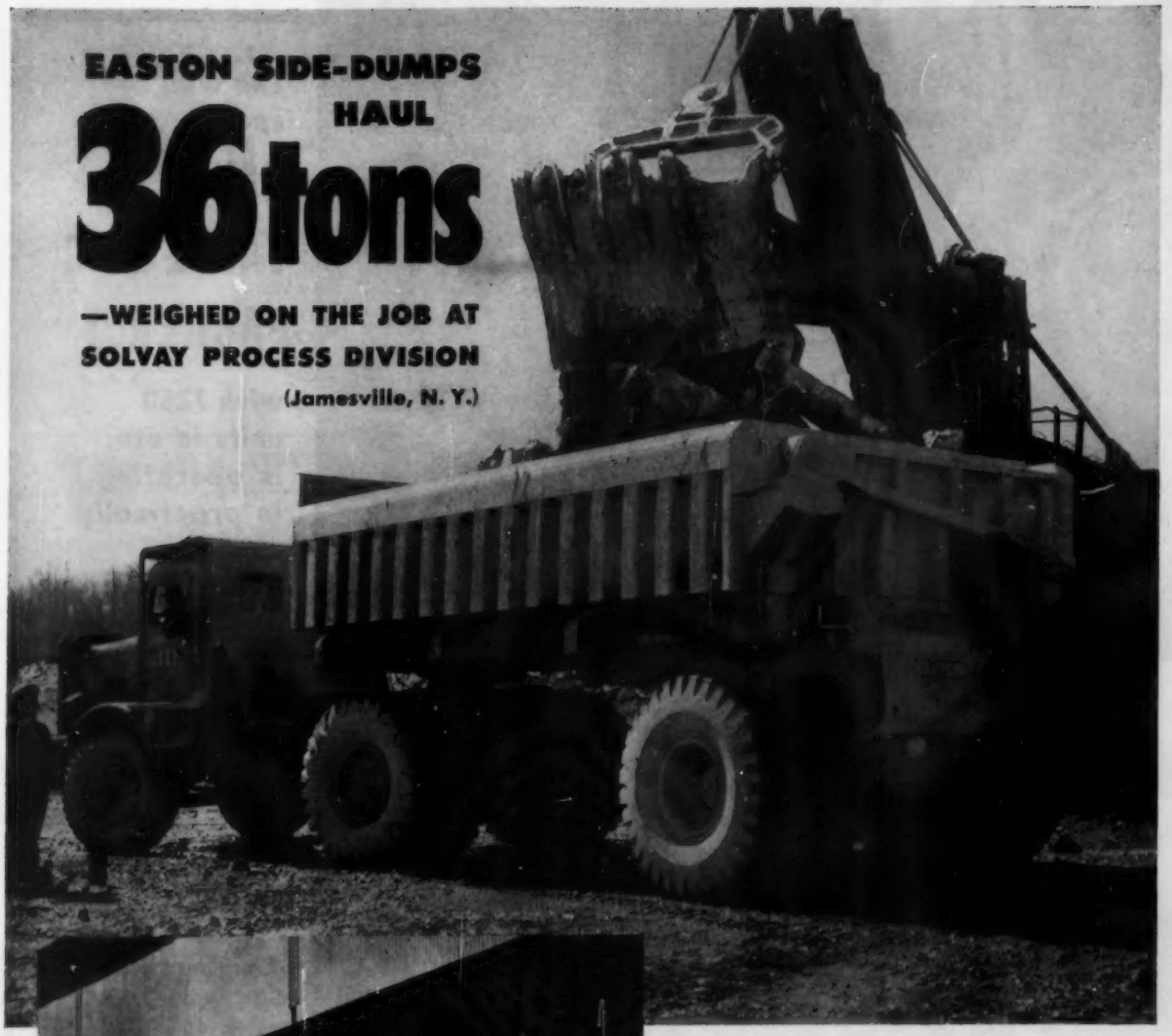

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Aetna Portland Cement Adds Fourth Kiln at Bay City

another ON THE SPOT report

IN MARCH of this year the Aetna Portland Cement Company completed a plant expansion program at Bay City, Mich., which has added at least 500,000 bbl. of annual capacity, bringing the total output of this wet-process mill to the level of

By WILLIAM M. AVERY

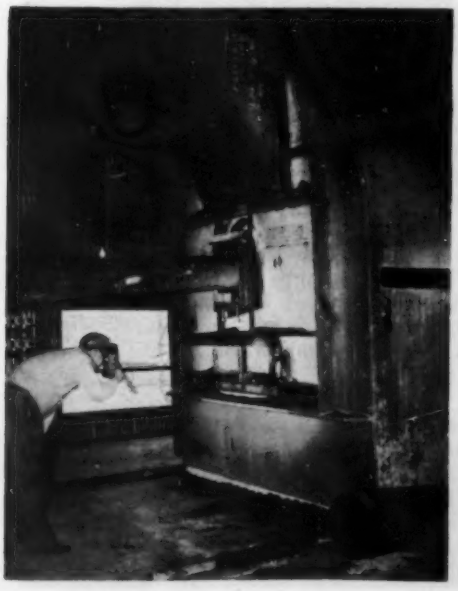
about 2,200,000 bbl. per year. The project included the installation of a new 10- by 175-ft. rotary kiln (making a total of four kilns in the plant), as well as such major auxiliary equipment as a coal pulverizer, a boiler for the utilization of waste heat from the new kiln, a grate-type clinker cooler, a 7- by 26-ft. two-compartment wet mill for additional raw-grinding capacity, and a 9½- by 16-ft. single-compartment mill for finish grinding. With a few exceptions, which will be noted later, the new facilities duplicate most of the equipment which was in service before the expansion program.

The Bay City mill is a wet-process plant with a "U" shaped flow sheet. Both coal and stone come into the plant by water, while clay, gypsum, and sand are received by rail. Since stone and coal for winter operations must be accumulated through the summer months, the storage system is of considerable size. The primary area is served by a 100-ft. gantry crane which mounts a 3- cu. yd. bucket, but material is also reclaimed from adjacent areas by means of Caterpillar bulldozers.

A 9,000-ton self-unloader, the "Harris N. Snyder", placing limestone screenings on the dock of the Aetna Portland Cement Company at Bay City, Mich.

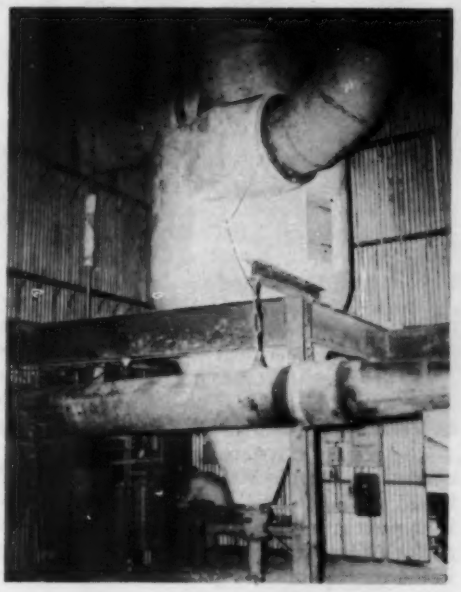
Since the stone delivered to the plant has already been sized to minus ¾ in., there are no crushing circuits for this material. Thus the first important equipment addition necessitated by the recent expansion program shows up in the raw-grinding department, where the three existing mills were already loaded close to the performance of the older units.

Accordingly each compartment of one of the mills was individually closed-circuited with a 4- by 5-ft. Tyler Hum-mer screen, and an existing bucket elevator was replaced by

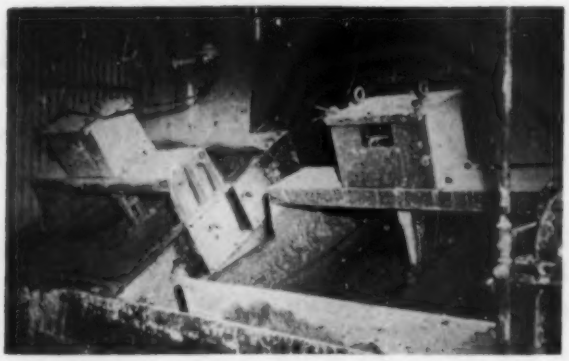


Left: The firing hood of the new 10- by 175-ft. rotary kiln at Bay City. Since moisture content and rate of feed are under rigid control, there are few variables in the operation, and hence the minimum of instrumentation.

Right: This mechanical collector removes dust from the hot air as it passes from the new kiln to the coal mill.



One of the 5- by 24-ft. air-quench coolers which deliver clinker from Aetna's kilns to a drag-chain handling system.



Each compartment of the new finish mill is individually closed-circuited with one of these 4- by 5-ft. single-surface screens.

Wilfley wide-port pumps to return oversize material. The pumps worked outstandingly well, and proved to be far more dependable for this type of service than elevators had been. Output of the mill as a result of the new hook-up ran approximately 105 bbl. per hr., compared with the 85 to 90 bbl. per hr. which had been peak production with open-circuit grinding.

A similar arrangement was accordingly used for the new 7- by 24-ft. two-compartment Allis-Chalmers wet mill. The first compartment is usually closed-circuited with an 8-mesh screen, while the product of the second compartment is passed over a 16-mesh screen, Wilfley pumps being used to close both circuits. The initial ball charge in the first compartment has a size range of 3½ to 1½ in., while in the second compartment the range is from 1¼ to ⅞ in. Oversize from either of the Hum-mer screens is returned to the front end of the mill. Oversize from the screens is washed down to the mill with a clay slurry at approximately 57 percent moisture, thus avoiding any need to add water when the material is on the coarse side. The new unit is driven by a 450-hp. motor, and its product averages approximately 88 percent passing 200-mesh.

With the present arrangement of two mills on closed-circuit and two on open-circuit grinding, the needs of the plant can be taken care of with one mill standing idle for five days out of the week. When the closed-circuit hook-up is adopted on all the mills, a step which the management plans to take in the near future, one unit will be on a stand-by basis all of the time.

The blending system at Bay City consists of six tanks 30 ft. in diameter by 25 ft. high. One of these units is at present used as a feed tank for all four kilns, but the company plans in the very near future to build a new tank for this purpose. When this work is completed, all of the present tanks will be used for blending, and the kilns will be fed from a new tank which will measure 45 ft. in diameter by 30 ft. high.

Slurry is delivered by means of a pump and a Ferris-wheel feeder to a battery of Oliver filters located above the new kiln. This two-battery system, each unit of which contains ten 12-ft. diameter disks, receives slurry at around 35 percent moisture and delivers it to the kiln at approximately 17½ percent. The Ferris-wheel feeder is an Allis-Chalmers unit, and the pump which supplies it is a 3-in. Wilfley. The feeder is driven by a constant-speed motor through a speed reducer and a selected-speed drive, and it carries a circulating load of around 200 percent.

Before the filter cake is fed to the kiln, it is mixed thoroughly with the dust recovered by mechanical means between the kilns and the stack. The handling system for dust consists of a common collecting screw for all four kilns, and a Fuller-Kinyon pump that distributes the material to separate bins from which the filter cake circuits are supplied. The two materials are brought together and mixed by means of screw conveyors and pug mills serving each kiln, the feed-in rate for the dust amounting to about 50 lb. per minute for each kiln. Feed to each kiln is by means of an inclined screw conveyor.

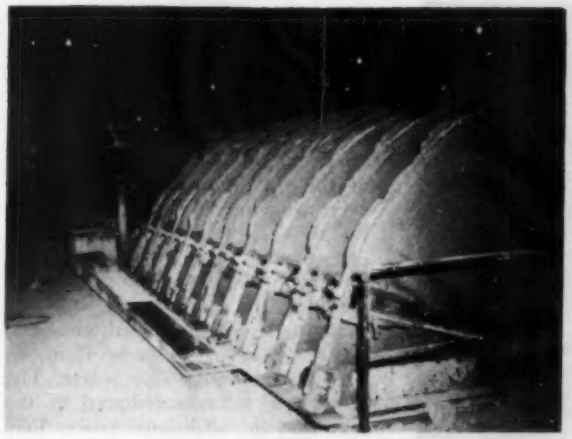
In practically all essential details the new kiln is identical to the three older burning units in the plant. It was supplied by Allis-Chalmers and measures 10 ft. in diameter by 175 ft. in length; it rests on two piers, slopes ½ in. per ft., and is driven by an Allis-Chalmers 100-hp. variable speed motor through a Link-Belt speed reducer and a conventional pinion and girth gear assembly. There is no stand-by drive.

The new kiln has a 6-in. basic lining in a 26-ft. section of the burning zone, then 70 percent alumina for a 20-ft. section, and 40 percent alumina for the remainder of the length. It is equipped with an Allis-Chalmers movable hood and B & W high-temperature retaining rings.

There are virtually no instruments on any of the kilns in the Aetna plant, most of the control being accomplished by variations in the firing. There are actually few variables in the operation, since both the moisture content of the slurry and the rate at which it is fed to the kilns are under rigid control. Thus the usual practice (except, of course, on start-ups) is to run the kilns at top speed (72 seconds per revolution) and hold all other factors constant except the firing.

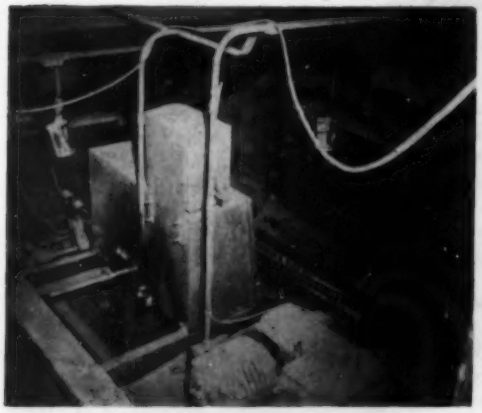
The new kiln is fired with an E-47 B & W coal mill which has a capacity of approximately 5 t.p.h. using 1¼-in. coal. This mill is somewhat oversize for the normal job it performs, but the excess capacity is required occasionally because of wide fluctuations in the moisture content of the coal. There are no separate facilities for drying coal, and the moisture content of the fuel may vary from 5 percent to 20 percent under extreme conditions. The coal is pulverized to around 85 percent passing 200-mesh before it is fired in the kilns. Coal is reclaimed from storage and distributed to various supply hoppers by means of a belt conveyor system. A Merrick scale in this handling circuit automatically weighs the total amount of coal consumed by all four kilns and by a small stand-by boiler in the powerhouse.

Aetna produces all its own power, using waste heat from the kilns to generate steam at 225 lb. pressure. Generating equipment consists of two 3600-r.p.m., 2,300-volt steam turbines—a 6,000-kw. Worthington and a 3,000-kw. General Electric. For the



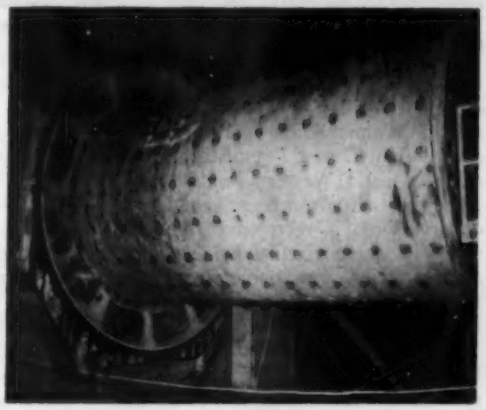
The moisture content of the slurry is reduced from 35 percent to around 17½ percent by means of two 10-disk batteries of filters.

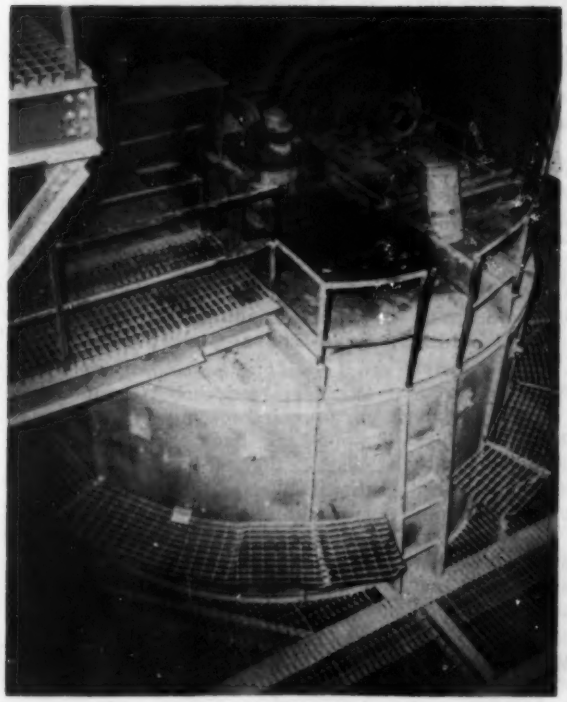
The hopper, screw conveyor, and pug mill by means of which recovered dust is fed to the filter cake and thoroughly mixed with it.

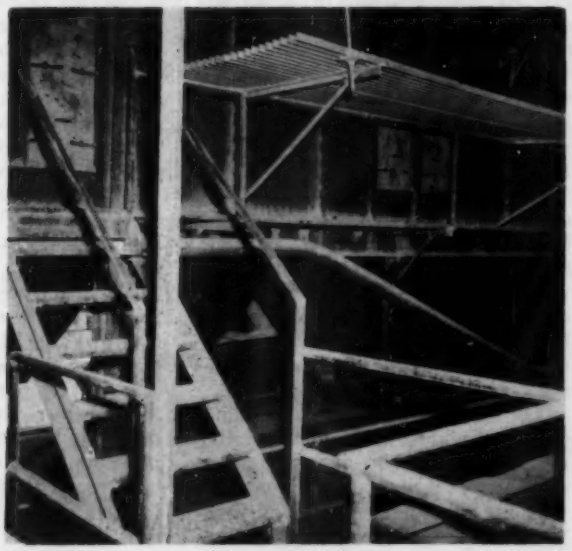


Left: These automatic weighing devices feed clinker and gypsum to the new finish mill.

Right: The new 9½-by 16-ft. single-compartment finish mill.







Bag cleaning in this mechanical dust collector is accomplished on a continuous, fully automatic basis by a traveling device which utilizes reverse air flow.

Left: A top view of the 16-ft. air separator which serves the new finish mill.

This pump transports cement from the finish-grinding department to the storage silos and the packhouse.

new kiln a Wickes single-pass boiler of about 1,000-hp. capacity was installed—a unit which operates in circuit with a Green Fuel Economizer and fan—and Western Precipitation Multiclones for mechanical dust recovery. Dust is recovered from all the waste heat circuits by means of a drag chain, and then delivered to the filter department by a Fuller-Kinyon pump.

All the kilns and all the waste heat boilers are tied into a common duct system. Gases on the entrance side of the boilers run around 1,350 deg. F., and 560 to 570 deg. on the exit side. As an integral part of the recent expansion program a new 14-ft. diameter by 150-ft. high stack was constructed. This structure, which will eventually serve three of the kilns, has a solid brick lining all the way up. The work was done by Rust Engineering Company.

Clinker from the new kiln discharges into a 5- by 24-ft. Fuller air-quench cooler, which in turn delivers the material to a drag chain at a temperature of approximately 120 deg. F. A settling chamber and a dust baffle on the end of the cooler serves to drop clinker dust ahead of the stack which serves the system.

The clinker-storage and handling system is almost a duplicate of the raw-material system; and, except for an increase in operating hours, this portion of the plant was not affected by the expansion program.

Additional equipment installed in the finish mill includes a 9½- by 16-ft. single-compartment Allis-Chalmers mill, a 16-ft. Sturtevant air separator, and a Sly Dynaclone dust collector which sweeps the mill. Two Merrick Feedoweights with 24-in. belts feed clinker and gypsum to the new mill, which normally operates at a rate of about 105 bbl. per hr. The mill carries an initial charge of 107,000 lb. of balls graduated from 3½ to 1½ in., and it operates generally with a circulating load of around 200 percent.

One of the features of the new finish mill installation is the incorporation of a Dynaclone collector for continuous peak-efficiency dust collection. By utilizing reverse air flow to loosen and remove built-up dust from one bag at a time, a traveling device inside the unit does the job of bag cleaning on a continuous and fully-automatic basis. This does away with the necessity of periodically shutting down half of the collector in order to clean the bags, a practice which substantially reduces the amount of air available for the mill. The Dynaclone installation for Aetna's new finish mill is about 30 ft. long and has a capacity of 13,600 c.f.m.

Air-sized material is conveyed from the Sturtevant separator by means of a 6-in. Fuller-Huron Airslide which discharges into a 6-in. Fuller-Kinyon pump. The pump in turn delivers the cement to storage silos. A sample of the finished cement is taken automatically at 3-hr. intervals by means of a motor-driven screw-type auger located in the Airslide discharge conduit.

Other finish-grinding equipment in the Bay City plant includes two 7- by 26-ft. single-compartment tube mills operating in circuit with a single Bradley mill, and three 7- by 26-ft. two-compartment tube mills. All of these units are fed with table feeders, and they are equipped with magnetic clutches to reduce starting loads.

The expansion project completed this spring did not include any work on either the cement storage system or the packhouse. New silos, however, are contemplated as a possibility in the near future. Other work recently completed, bearing some relationship to the expansion program, includes the installation of new switch gear in the powerhouse, and the construction of a new 48-in. intake tunnel for cooling water. The latter work was necessitated by the fact that the additional power load required the regular operation of both turbines, whereas formerly only one of the units was required to carry the full load.

About 180 hourly workers are employed in Aetna's operations at Bay City. Ben W. Calvin is president and general manager of the company, E. A. Harris is vice-president in charge of operations, Alec Devens is plant superintendent, and Paul Bischoff is chief chemist. The original plant was built with a single kiln in 1924. A second kiln was built the following year, and a third went into service in 1948.

NAHB Awards Contract For Natl. Housing Center

The National Association of Home Builders has awarded a contract for construction of its $2,000,000 national housing center, to be erected in Washington, D. C. The Joseph F. Nebel Company, Washington construction firm, will build the structure.

The building site in midtown Washington already has been cleared, and formal ground-breaking ceremonies were held on May 17, in conjunction with the annual spring meeting of the N.A.H.B. national board of directors.

Topeka Producers Organize Sand-Gravel-Concrete Group

The Topeka Sand, Gravel and Concrete Producers Association was incorporated recently in that city on a non-profit basis. Papers filed in the office of the secretary of state stated that its purpose is to provide producers "with an effective agency through which to express their collective voice on all matters."

Incorporators are M. M. Small, Otto Kuehne Jr., J. A. Smith, and H. W. Gerlach. Ralph F. Glenn, attorney, 212 Capitol Federal Bldg., is the resident agent.

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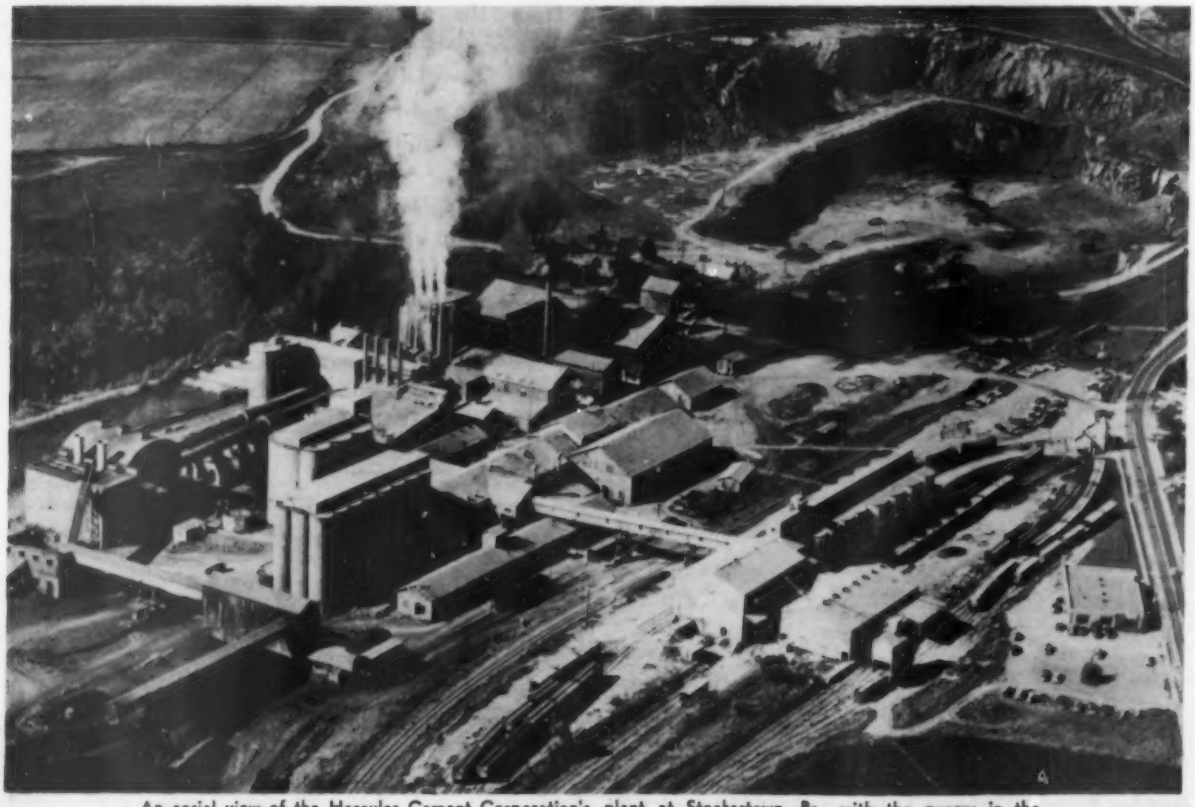
HERCULES
Improvement Program

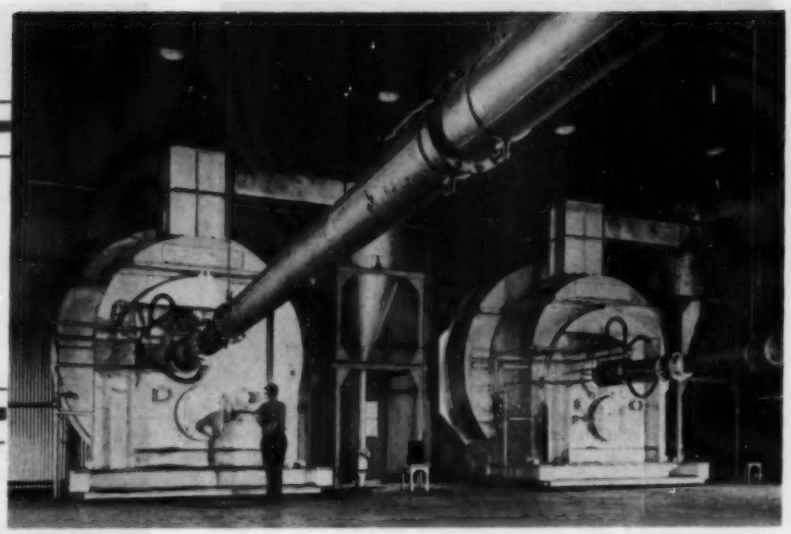
New kilns and dry blending system installed to improve efficiency and economy and to add capacity

By WALTER E. TRAUFFER

ONE of the many important improvement programs which in recent years have greatly increased the capacity of the cement industry to meet the swelling demand, and which have increased efficiency and held down operating costs, was recently completed at the Stockertown, Pa., plant of the Hercules Cement Corporation. Two large new kilns replaced five smaller old kilns, and new related equipment was installed including a kiln feed storage, coal mills, coolers,



An aerial view of the Hercules Cement Corporation's plant at Stockertown, Pa., with the quarry in the background. At the left are the two new kilns and related buildings and equipment.



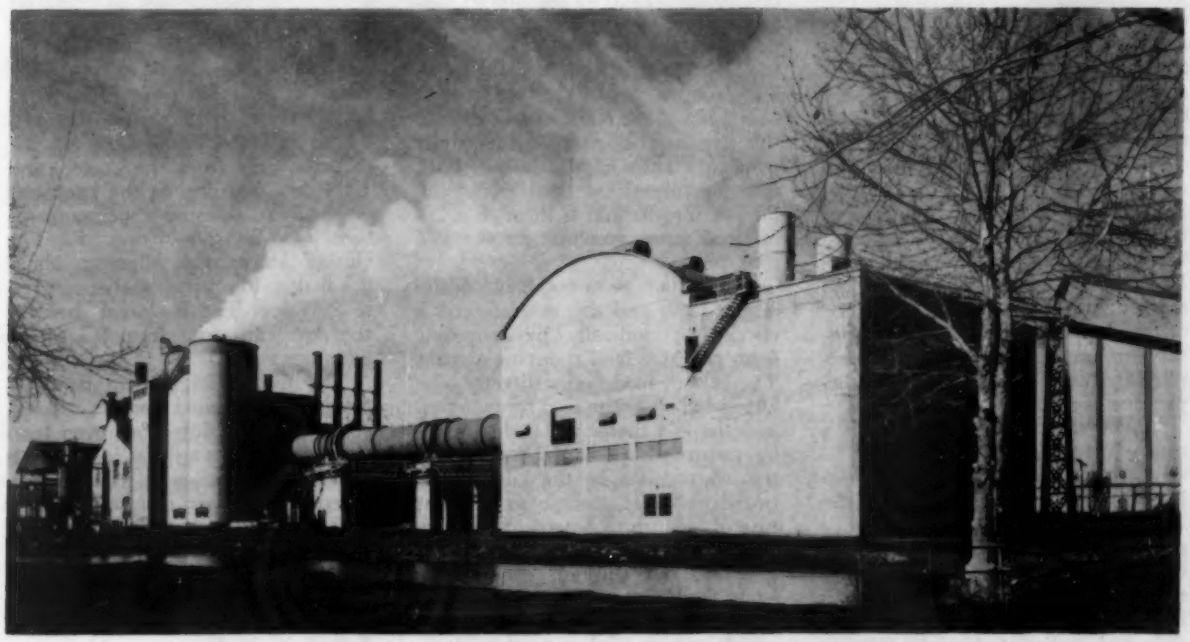
The firing hoods of the two new kilns. Note the coal pipes and the cyclones on the air ducts to the coal mills.

etc. The nine old kilns averaged approximately 6,200 bbl. daily. The two new kilns and the four remaining old kilns can produce 9,400 bbl. daily—the new kilns 3,300 bbl. each, and the old kilns 700 bbl. each. The finish-grinding department can produce about 11,000 bbl. of Type I daily. In normal operation two small and two large kilns are operated, since the raw-grinding department has a capacity of about 8,000 bbl. daily.

Construction of the original dry process plant was begun in 1906 but was discontinued before completion. The Hercules Cement Corporation was formed to take over this plant and completed its construction in 1916. The original plant had twelve 7½- by 7- by 125-ft. kilns, but three of these were soon taken out. For some years only some of the other nine kilns were operated, but demand soon caught up and required capacity operation.

The original plant wasted the heat from the kilns until 1926 when waste-heat boilers were installed. In 1926 also a new crushing department and a new stone storage building were built. A new packing department was built in 1941, and a hammermill was installed in the crushing department in 1949.

The latest improvement program described in this article was begun in 1951. The first step was the addition of an auxiliary boiler to make the plant as nearly independent of outside power as possible. In 1953 the quarry inclined hoist was extended to the new lower level, and a mill was added in the raw department and another in the finish department. The first of the two new kilns was in operation in January, 1953, and the second in June of that year, along with new coal mills, cool-



A view of the plant, showing the new kilns, a coal mill, the kiln feed buildings, and the kiln feed silos.

Above: One of the two enclosed kiln control boards, on which are centralized controls for the operation of the kiln and coal mill.

Right: Another view of the kilns taken from the feed end. The raw silos are in the foreground.

ers, flues, all necessary conveying equipment to the clinker silos, etc.

A Fuller-Kinyon pump feeds the ground raw material from the mills into 12 concrete silos, each 18½ ft. in diameter by 75 ft. high, and holding 2,000 bbl. Some of the star bins are also used. Sampling is done ahead of the pump on the material going into each silo. Blending is done from these silos by four rotary vane feeders driven through Link-Belt P.I.V. variable-speed reducers.

Material is usually blended from three or four silos at one time. Screw conveyors under each row of four silos feed to a cross screw conveyor which discharges to a bucket elevator for the old small kilns and to a 10-in. Fuller-Kinyon pump for the two new large kilns. The pump discharges the cement into two 3,000-bbl. silos, each having concrete vertical sections 30 ft. in diameter by 41 ft. high and conical steel bottom sections 18¾ ft. high. The material in these silos is aerated by means of three sections of 8-in. Airslides placed vertically on the inside of each cone. Each section consists of an 8-ft. and a 10-ft. Airslide in tandem. As many of the Airslides can be used as necessary for proper aeration. Air is supplied by two Roots-Connersville low-pressure blowers.

Under each of the two silos is a rotary valve which is used only to shut off the flow. The rate of feed is controlled by a Fuller air feeder which discharges to a 16-in. Airslide conveyor. There is a duplicate conveying system for raw material from the silos to the kilns. Each system is independent of the other. Each Airslide has a Fuller Airslide gate, so that it can discharge into one of two surge bins through chutes or direct to the second surge bin. Each bin is equipped with high- and low-level Bindicators which automatically control the flow of material to the surge bins by means of solenoid controls of the rotary valves under the silos.

Under each of the surge bins, still in duplicate, is a 20-in. screw conveyor feeding to a high-capacity bucket elevator. These screws also receive the dust collected in the kiln flues to be described later. They are shrouded in both directions to prevent flooding of the fine raw material. Each elevator discharges to its own 20-in. circulating screw conveyor. These two screws are side by side and both discharge to the feed hoppers over the two kilns. The hopper for No. 3 kiln is first, and the overflow from it goes to the feed hopper of the No. 2 kiln. The overflow from this hopper is discharged by gravity from the ends of the screws back into the surge bins. Feed from each hopper into its kiln is through a 20-in. feed screw conveyor to the kiln feed pipe.

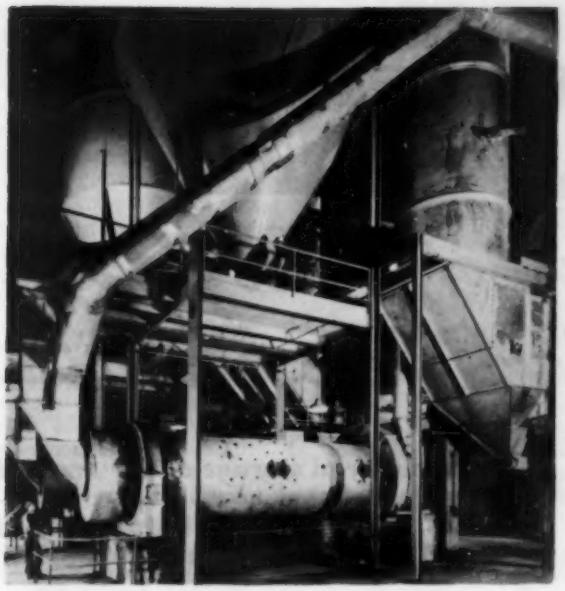
This system gives excellent control of the feed, and the rate of feed is checked periodically by bypassing from the kiln feed spout to a scale. The rate of feed varies directly with kiln speed since the feed screw motor and the kiln motor are tied together by means of a Ward-Leonard system. A rheostat on the kiln control board makes it possible to vary the rate of feed up to 5 percent in either direction. Further checks on output are obtained through counters on each feed screw and the Merrick Weightometer on the belt conveyor which carries clinker to storage.

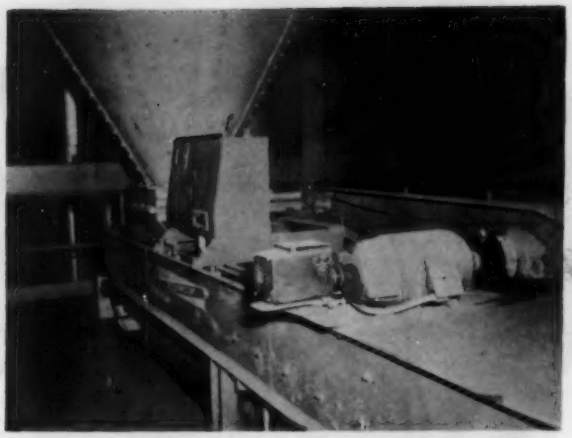
Each of the two 12- by 280-ft. F. L. Smidth all-welded rotary kilns is mounted on four tires and has an air-cooled seal on the discharge end, the air being provided by a small blower. Each kiln is driven by a 125-hp., 1150-r.p.m. d.-c. Westinghouse motor through a Falk reducer with a 104.3 to 1 ratio, and is served by a standby 55-hp. Hercules gasoline engine with a 10.07 to 1 Falk reducer which drives through the big reducer. Each kiln is lined with 190 ft. of 6-in., 50 percent alumina bricks at the feed end and 90 ft. of 9-in., 70 percent alumina brick in the burning zone.

The kiln is operated at a uniform speed—60 r.p.h.—and any variations are normally adjusted through the coal feed. This method has been found to give the best operating temperatures, which are 190 deg. F. for the primary air from the coal mills, 1,200 to 1,400 deg. for the secondary air from the cooler, and 1,400 to 1,600 deg. at the back end of the kiln. Burning zone temperature is 2,700-2,800 deg. F. The clinker leaves the kilns at about 2,500 deg. F. and the coolers at 150 to 200 deg. The back-end draft in the new kilns runs from 0.3 to 0.5 in. water gauge.

The main kiln control board is completely enclosed and an exhaust system helps maintain an even temperature. The board has instruments registering back-end draft, kiln speed, gas analysis, exit gas and coal mill air temperatures, coal feeder speed, and includes a Bailey oxygen analyzer.

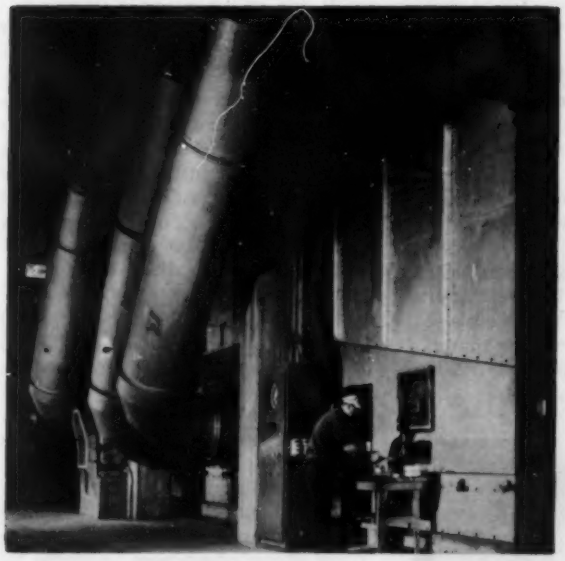
Each kiln is direct-fired by a Smidth Tirax ball mill which is 6 ft. 6 in. in diameter, with a two-chamber, 15-ft. 9-in. grinding sec-

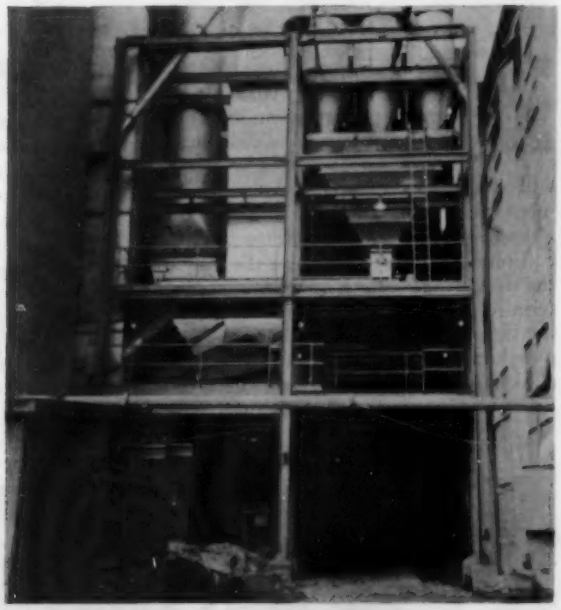




Above: The weighing feeder which supplies the coal mill from the bin.

Left: The two ball mills which fire the new kilns, and the coal feed bins (above).





Left: One of the two 6- by 44-ft. inclined-grate type clinker coolers.

Right: One of the three 6-cyclone collectors between the waste-heat boilers and the stacks.

tion and a 9-ft. 6-in. drying chamber at the feed end. The first grinding chamber has 10,000 lb. of 2-, 1½, and 1¼-in. grinding balls; the second chamber has 25,200 lb. of ⅞-in. balls. Each mill is driven at the rate of 22.4 r.p.m. by a 200-hp., 870-r.p.m. motor through a Falk speed reducer. The maximum capacity of each mill is 14,100 lb. per hr. Coal is exhausted from each mill by a 100-hp. fan and through a 12-in. water-jacketed burner pipe into the kiln. This fan draws hot drying air from the kiln hood into the mill. This air is automatically tempered through an air-operated valve so that the primary air leaving the mill remains near 190 deg. F. This means an inlet temperature into the mill of 500 to 600 deg. F. A cyclone removes dust from the circuit and discharges it into the cooler.

The coal used averages 13,000 B.t.u. or more. Coal consumption for the new kilns has averaged 66 lb. per bbl. The smaller old kilns average 90 lb. per bbl. Coal is unloaded from railroad cars to a hopper from which a 20-in. belt conveyor feeds to a Pennsylvania single-roll crusher. A bucket elevator feeds the crushed coal to a 3-way spout. One option is by belt conveyor to an open storage. The second, for the old kilns, is *via* a hopper and table feeder to a Merrick Weightometer and then by conveyor to a Fuller Airveyor, which discharges the coal into bins over the Strong-Scott direct-firing pulverizers of the four old kilns.

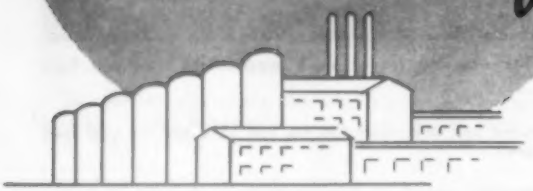
The third option, for the new kilns, is *via* a 20-in. belt conveyor over a bridge, to an inclined belt conveyor and screw conveyor feeding the two 100-ton coal mill feed bins. Feed to the Tirax mills is controlled by Merrick Feedoweights.

The gases from each large kiln are exhausted to a horizontal circular flue which has a 12-ft. inside diameter and is lined with 9-in. fire brick. Each flue has a hoppered bottom lined with 6-in. firebrick. A 12-in. reversible screw conveyor in the bottom of each flue makes it possible to feed the dust to either of the

(Continued on page 91.)

UNIVERSAL-ATLAS

Completes First of Three Stages of Plant Reconstruction



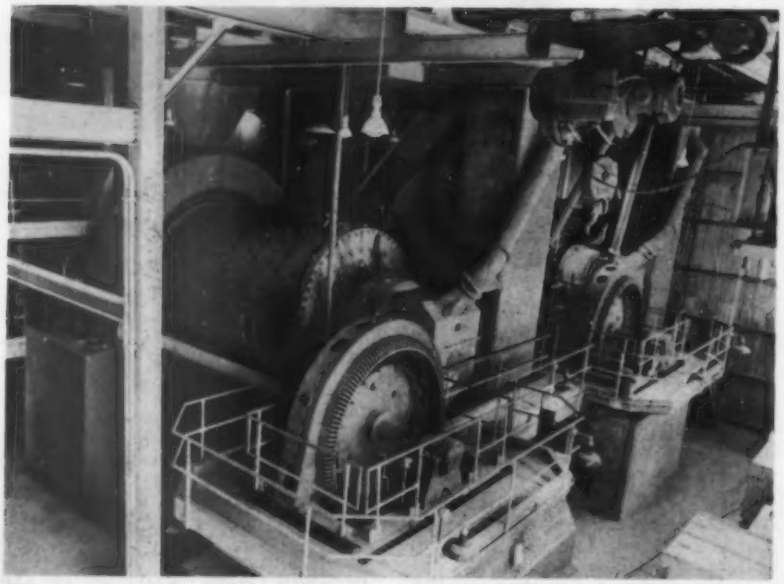
New raw material storage and drying and grinding department now in operation — New kilns, coal mills being installed; third stage will be a new clinker department.

another ON THE SPOT report

By WALTER E. TRAUFFER

THE Universal, Pa., plant of the Universal Atlas Cement Company is undergoing a complete rebuilding in three separate stages which will result in a completely new cement plant and the elimination of almost all the old buildings and equipment. This program calls for the following: (1) a new raw-material storage and drying-and-grinding department, now completed; (2) new kilns, coal mills, etc.; (3) a new clinker-grinding department. Careful planning years in advance is making it possible to carry out this program without loss of production, and will result in a finished plant as well and compactly designed as if it had been built new from the ground up. Ample provision has also been made for possible future expansion, space being left for a third kiln and other necessary equipment. Like the old plant, the new operation will use the dry process.

In building the new raw material department the parent United States Steel Corporation also made a major stride forward in its Pittsburgh district-wide smoke-control campaign. The switchover to the new raw-material department took out of operation a total of 14 raw material driers whose stacks emitted considerable of the smoke and dust coming from this plant. When the entire program is completed, a total of some 38 smoke-stacks will have been eliminated. The design contemplates that total plant dust loss will be less than 10 percent. The new plant will have only two major stacks, connected to the kilns and driers, and all gases leaving them will first pass through mechanical dust collectors and electrical precipitators.



A view of the raw ball mills, the drives, the hopper bottoms of the air separator, the ball mill feed hoppers, and the conveyors at the Universal (Pa.) plant of the Universal Atlas Cement Company, now undergoing a rebuilding program.

The closing of the old raw department and the opening of the new was celebrated on January 18 by an open house which was attended by township, county, and smoke control officials and by civic leaders.

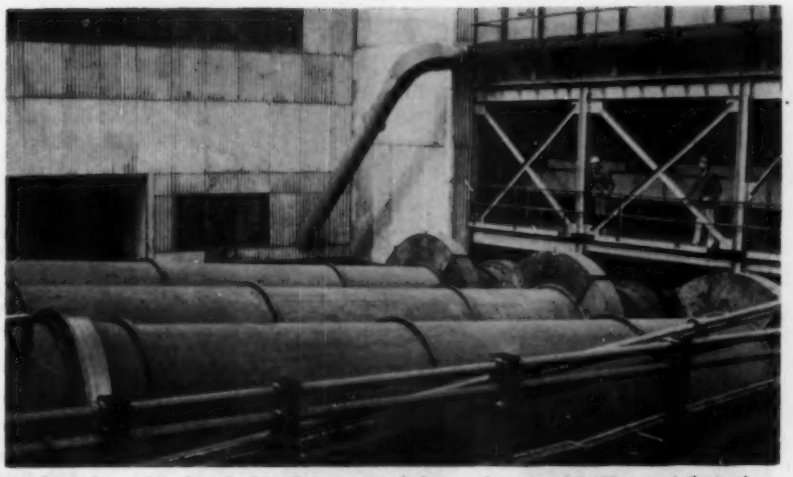
The original cement plant, built in 1906-7 by the Carnegie Steel Company, had nine 7½- and 6½- by 20-ft. kilns. Eleven duplicate kilns were added in 1910. This was strictly a waste-product plant at that time; waste gas from blast furnaces generated power at the steel mill, and raw materials were slag from the blast furnaces and limestone screenings from the flux stone produced at Steel Corporation quarries. During the years improvements and additions were made to various departments; however, the plant was not changed basically after 1910-11.

The present program began in October, 1952, when the dismantling of half of the old raw mill was be-

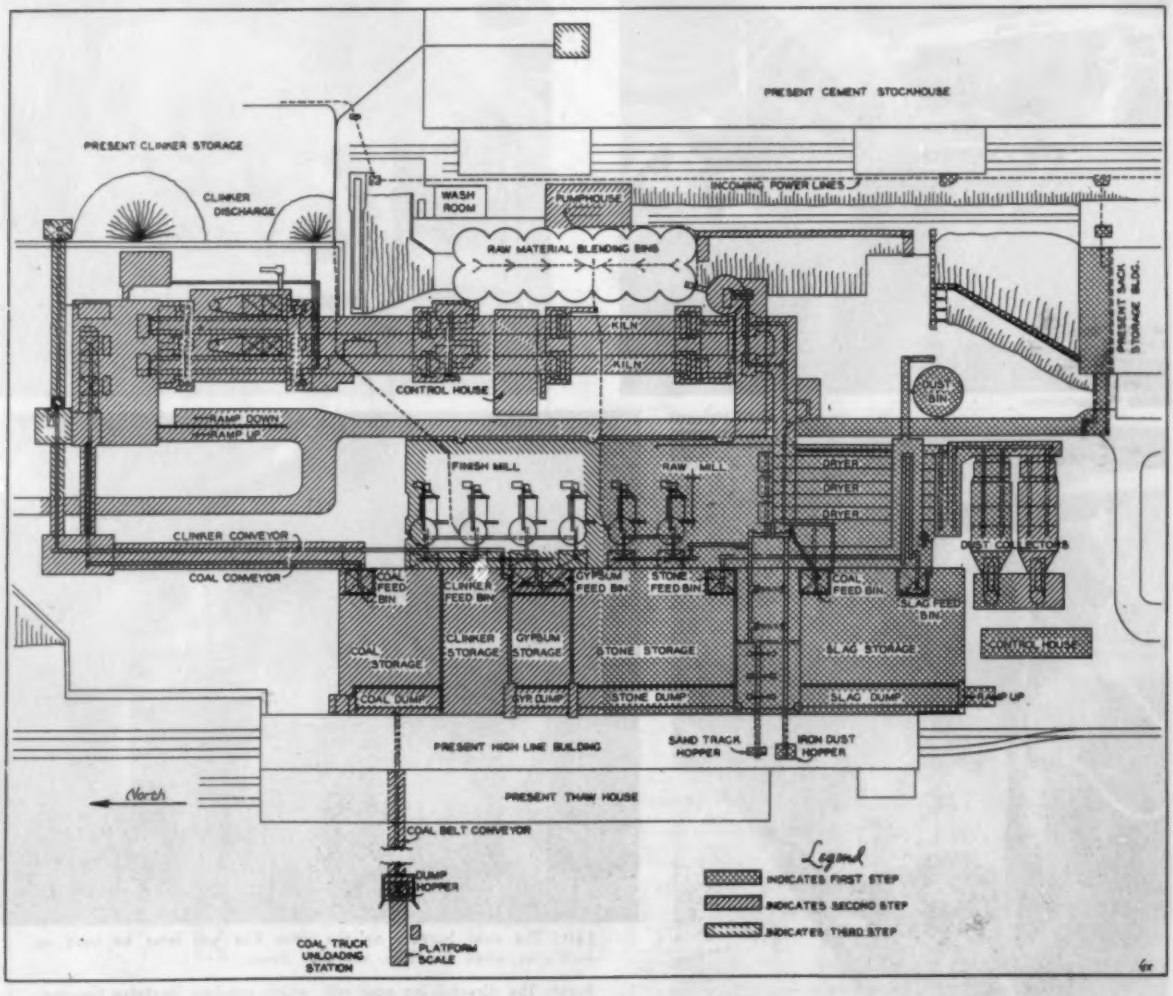
gun. The new raw mill was built in this location and went into operation in January, 1954. While this was going on, the ten oldest kilns were dismantled; the two new kilns are going partially into their place. These are expected to be in operation in November, 1954. Now the other half of the old raw mill is being torn down, and the new finish mill will be built in this location. Plans call for completion of this new department in 1955.

Briefly, in this program, the old 320- by 175-ft. raw mill building has been replaced by a new 175- by 80-ft. location. The 21 old tube mills, 5 by 22 ft. and 6 by 22 ft., have been replaced by two 10½- by 16-ft. units. The 14 rotary driers, each 5 ft. 5 in. by 46 ft., have been replaced by three 8- by 80-ft. driers.

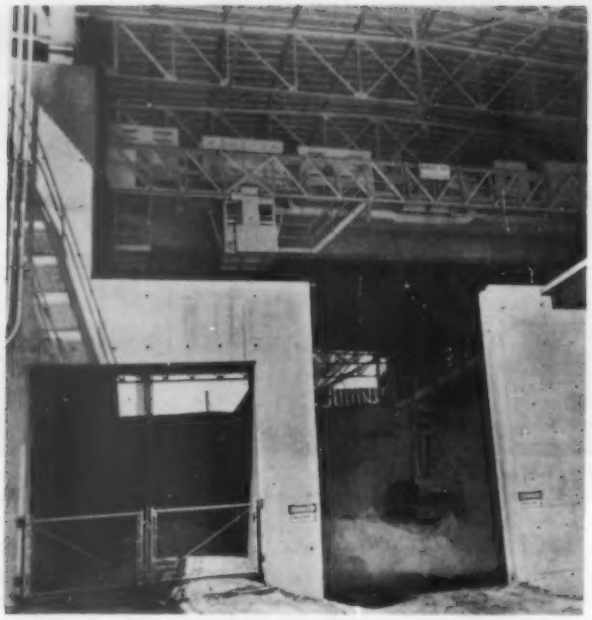
In the burning department the place of the old 275- by 160-ft. building is being taken by a new area. The 20 old kilns, each 7½ and 6½ by 120 ft., are being replaced by two new 11- by 360-ft. kilns. There will be clinker coolers, and waste heat will be used for drying the raw materials. Thirty-year-old electrical tube-type precipitators on each kiln served the 20 old kiln stacks. Two new combination mechanical dust collector and electrical precipitator units have been installed to serve the new driers and kilns.



Air heated to 1,200 deg. F. dries limestone and slag at the rate of 2,625 tons daily in these three cylindrical driers at the raw-material processing mill. Each unit is 80 ft. long by 8 ft. in diameter.



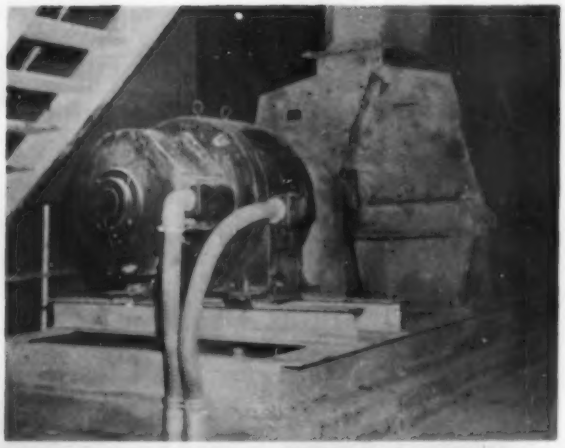
Plant layout, showing the three steps in the modernization program.

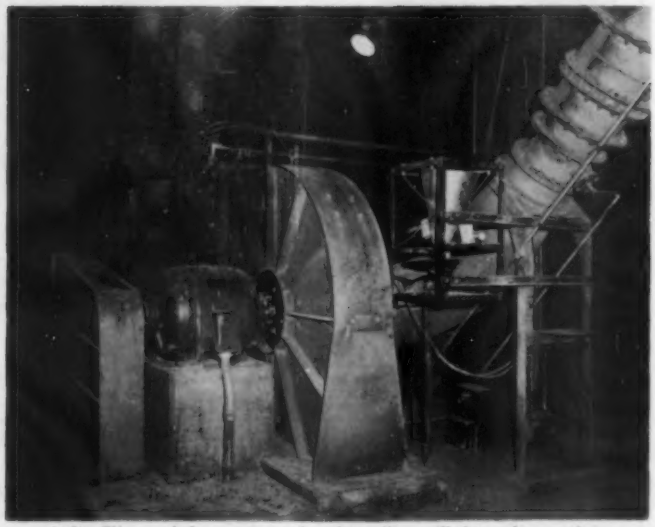


Left: A corner of the raw-storage building, showing the overhead crane, and the slag storage.

Left, below: Automatic scales weighing slag as it moves along a hooded conveyor belt from the cylindrical driers at the new raw-material processing mill. It is the duty of Floyd Dodson as assistant chief chemist to see that cement raw materials reach the ball mills in proper proportions.

Right, below: A reversible hammer mill and its 100-hp. motor. This unit crushes blended and dried raw materials.





Left: The coal burners on the drier flue will later be used as auxiliaries when the kilns are shut down.

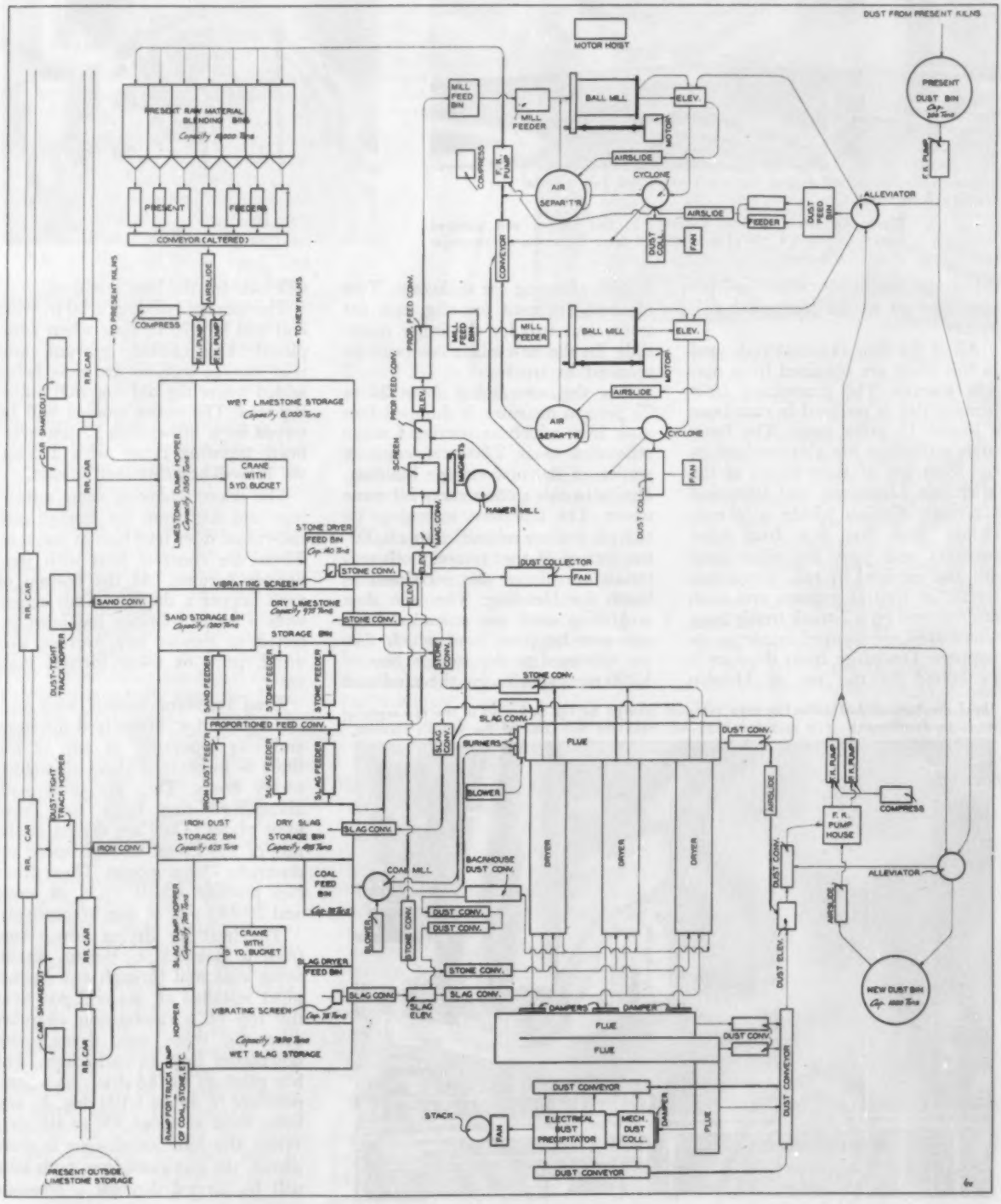
Right: The direct-firing coal mill, which provides heat for the raw-material driers, with its drive, fan, and vibrating feeder.

The new finish grinding mill will be built adjacent to the raw mill for more efficient operation. The 24 old tube mills, 5 and 6 ft. in diameter by 22 ft. long, are to be replaced by four 10½- by 16-ft. ball mills identical with those in the raw department. One overhead traveling crane in the clinker storage has been installed to replace three old cranes.

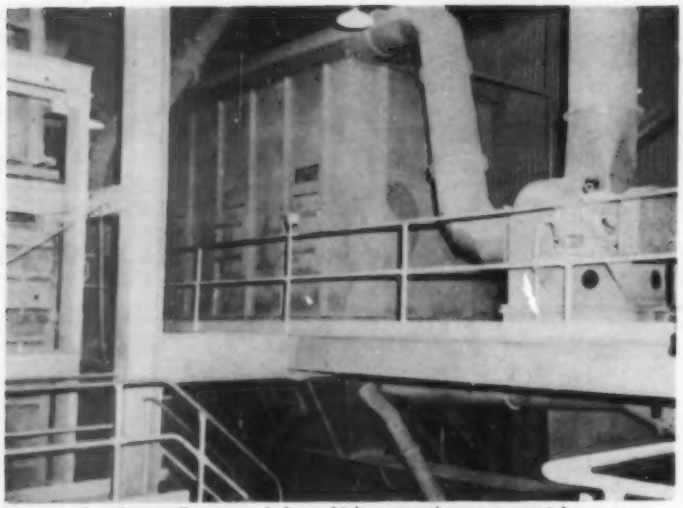
Coal had been dried and ground in a central coal preparation before going to the plant of kiln coal feed bins. In the new plant each of the kilns will have its own direct-firing coal mill. Only 200 tons of coal will be required daily, as compared to 550 tons in the old mill.

These kilns will be among the largest dry-process kilns in this country and are expected to operate with very low fuel consumption (perhaps 65 lb. of 12,000 B.t.u. coal per bbl.) and low labor cost. The raw grinding department is expected to operate on 7½ kw. hr. per bbl.

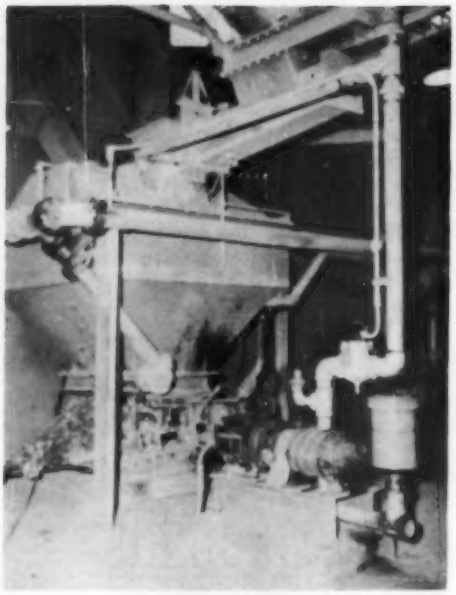
Probably the most unusual feature of this plant will be the use of waste heat from the kilns for drying of the raw materials. Water sprays will be used to cool the gases when the



Flow diagram of the new raw material storage, drying, and grinding department.



Above: The dust collector and fan which serve the raw-material crushing department.



Right: Reclaimed dust is gathered in this hopper and pumped back into the raw mix at a controlled rate. Note the air conveyor above the hopper.

driers are not in operation and before they go to the stack dust collectors.

All of the four raw materials used in this plant are obtained from outside sources. The granulated blast furnace slag is received in cars from a source 15 miles away. The limestone screenings are also received by rail from any of three plants of the Michigan Limestone and Chemical Company division within a 50-mile radius. Iron flue dust from blast furnaces and pure dry silica sand are also received by rail. These materials, as well as gypsum and coal, are received on a 2-track trestle from which they are dumped into separate hoppers. Discharge from the cars is facilitated by the use of Hewitt-Robins vibrating car shakeouts. Two of these are used for slag, two for stone, and two for the other materials. In the new plant coal will be received in trucks.

The slag, containing about 20 to 25 percent moisture, is dumped into a pit from which an overhead crane rehandles to a 2,800-ton capacity section of the new storage building. Drains in this section carry off some water. The limestone screenings go to a pit and are rehandled to a 6,000-ton section of the storage. Both materials are placed and reclaimed in layers for blending. The iron dust and silica sand are unloaded from cars into hoppers, from which they are conveyed to dry storage bins of 1,200-ton capacity for the sand and 625 tons for the iron flue dust.

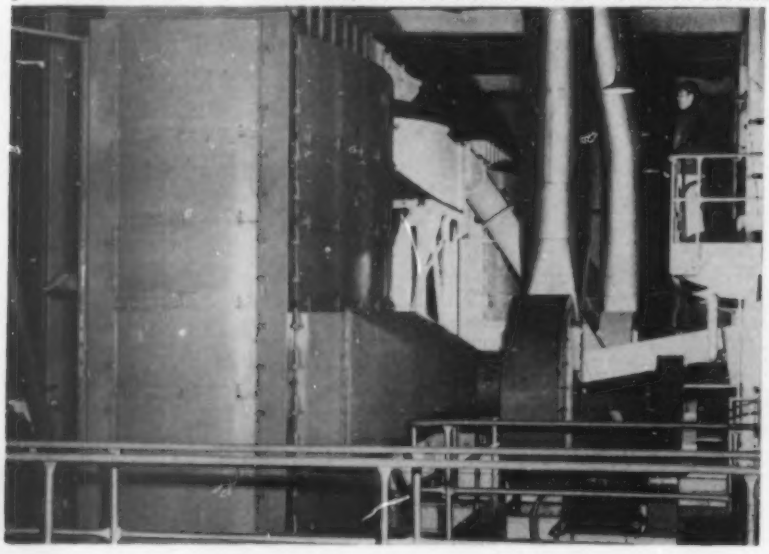
The storage building is 80 ft. wide and will be 375 ft. long when completed. The clinker, gypsum, and coal storage sections are now being added where the old raw mill building was. The entire storage will be served by a Milwaukee 15-ton overhead traveling crane with a 5-cu. yd. Blaw-Knox clamshell bucket.

The crane rehandles stone screenings and slag from the storage into individual drier feed bins at one side. These are concrete bins with steel hopper bottoms. At the bottom of each hopper a sloping grizzly screen with a motor vibrator has been inserted to remove any oversize material, iron, or other foreign matter.

Drag conveyor feeders with variable-speed d.-c. drives feed the stone and slag separately to any of the three 8- by 80-ft. Vulcan all-welded rotary driers. They are lined with abrasion-resisting brick and have lifter plates. They are driven at the rate of 5½ r.p.m. through speed reducers by 75-hp. motors. These driers can produce 65-70 t.p.h. of stone and 20-25 t.p.h. of slag, respectively.

The heat for drying now comes from a Babcock & Wilcox direct-firing coal mill through two burner pipes installed at one end and near the top of a combustion chamber over the three new driers, with downcover flues to each drier. The hot gases go to the driers at a temperature of about 1,400 deg. F. and leave them at about 300 to 400 deg. When the kiln installation is completed, the exit gases from both kilns will be carried through a common

These mechanical dust collectors trap the dust created by the ball mills in the raw-material grinding department. It is said that they will make the mill "one of the world's cleanest."



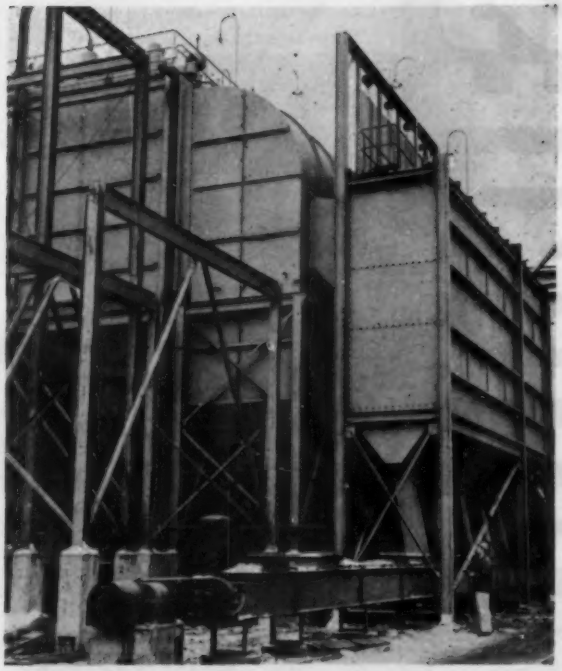
flue to the present combustion chamber and to the three driers. Inlet temperatures will remain about the same. The coal mill and burners will be retained for auxiliary use if necessary when the kilns are shut down. The coal mill is V-belt-driven by a 100-hp. Allis-Chalmers motor.

The material discharged from the driers is carried by individual series of drag conveyors, bucket elevators, and drag conveyors to the top of the dry-storage bins. The dry stone storage bin has a capacity of about 975 tons, and the slag bin of about 475 tons. These are adjacent to the iron and sand bins previously described.

The raw materials are proportioned from these bins by Merrick Feedoweights under them—two for stone, two for slag, and one each for sand and iron dust. A typical mix used could be 360 lb. of limestone, 150 lb. of slag, 10 lb. of sand, and 5 lb. of flue dust per bbl. These Feedoweights discharge to a drag conveyor, and a bucket elevator feeds the raw mix to a 5- by 12-ft. Tyler Ty-Rock 2-deck screen with 1-in. and ⅜-in. openings. The plus ⅜-in. material goes to a Williams Type GA reversible hammer mill from which it discharges back to the elevator ahead of the screen, forming a closed circuit. The hammer mill is direct-driven by a 125-hp. motor.

The minus ⅜-in. material through the bottom deck of the screen is taken by a bucket elevator to a drag conveyor over the two ball mill hoppers. This conveyor is so arranged that as the first hopper fills up, the material carries on to the second. Each hopper has a bin signal system which automatically stops the Feedoweights for full bins; changes the feed from the first hopper when it is full to the second hopper; and when that is full shuts off the entire grinding circuit. When the bins are emptied to a certain level, the Feedoweights only are automatically started.

The proportioned and ground raw mix is fed from these hoppers by variable-speed drag conveyors into the two raw-grinding ball mills. These are 10½-ft. dia. by 16-ft. long Traylor mills driven at 17.6 r.p.m. by 1,000-hp. General Electric synchronous motors. The drive is a 10 to 1 direct gear drive through a long shaft and rigid coupling with the motor at the end of the mill opposite the drive gear. The motors are equipped for inching of the mills for ball loading, etc. Each mill is loaded to about 35 percent of its volume with 60 tons of U. S. Lorain grinding balls. Equal weights of 2½-, 2- and 1¼-in. balls are used. Lorain rolled steel liners are used in the mills.



Electrostatic precipitators have the final chance at cement dust at the new raw-material mill, which went into operation on January 18, 1954. Dust is discharged to the system which feeds the dust storage tank.

Each grinding circuit runs with a high circulating load. Each mill produces about 50 t.p.h. of raw material, at about 88 percent through 200-mesh.

Each mill discharges to a bucket elevator followed by a Fuller-Huron Airslide conveying to a 16-ft. Sturtevant separator. The tailings from the separators are discharged back into the mills. The fines from the two separators are carried by individual screw conveyors to a 10-in. Fuller-Kinyon pump which discharges to the kiln feed blending tanks.

The dust collector hoppers and the flue which will carry the gases from the new kilns to the driers, have hopper bottoms from which the dust is drawn off by screw conveyors. Dust will be returned via conveyors, Airslides, and conveyors to a 6-in. Fuller-Kinyon pump which can deliver the dust into either a 1,000-ton steel dust storage tank, or to a dust bin in the raw mill from which it is returned to the grinding circuit output. The flue dust from the present kilns is now fed to this tank by a 6-in. Fuller-Kinyon pump which will later serve as a space for the 30-ft. bin pump.

The driers now in operation are connected to one of two new Western Precipitation Corp. combination Multiclone and Cottrell electrical precipitators. The dust collected is discharged to the same system feeding the dust storage tank.

An air feeder and an Airslide feed the dust from the tank to the same 6-in. Fuller-Kinyon pump, which discharges it into a small feed bin in the mill building. A variable-speed choked screw feeds the dust back into the raw mix at a rate decided by the chemist. It discharges to an Airslide which delivers to the finished-raw-material Fuller-Kinyon pump. The dust feed system is automatically controlled by Bindicators on the dust feed bin.

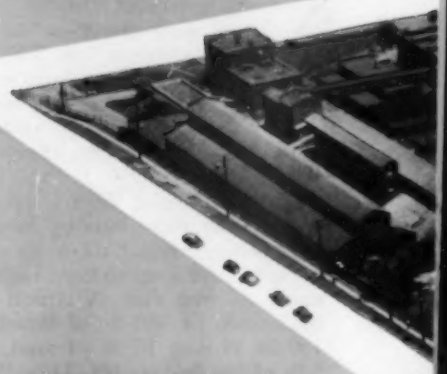
There are 14 old reinforced concrete blending tanks each of 2,300-bbl. capacity, and each 20 ft. in dia. by 57 ft. high. These are fed consecutively. Final blending is done by withdrawing from six of the tanks at one time by means of inclined-screw variable-speed feeders. A main screw conveyor is followed by an Airslide conveyor to a 10-in. Fuller-Kinyon pump which now feeds the blended raw material to a screw conveyor over the feed hoppers of the old kilns.

When the two new kilns are installed, the Fuller-Kinyon pump will feed the blended raw material into a large storage tank. A Fuller air lift will feed to two choke screw conveyor feeders of the two kilns. The entire feed system will be automatic, overflow from the kiln feeders going back to the storage tank and overflow from the storage tank going back to one of the blending tanks, which will necessarily be kept low.

(Continued on page 90.)

GENERAL REFRACTORIES

View of General Refractories' Baltimore Plant, devoted exclusively to the production of basic products, and (insert) battery of brick presses in Grefco Baltimore plant.



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First Published Report of American Experience With Suspension Type Preheater

Full-scale cement kiln installation at Evansville, Pa., achieves very high thermal efficiencies

another ON THE SPOT report

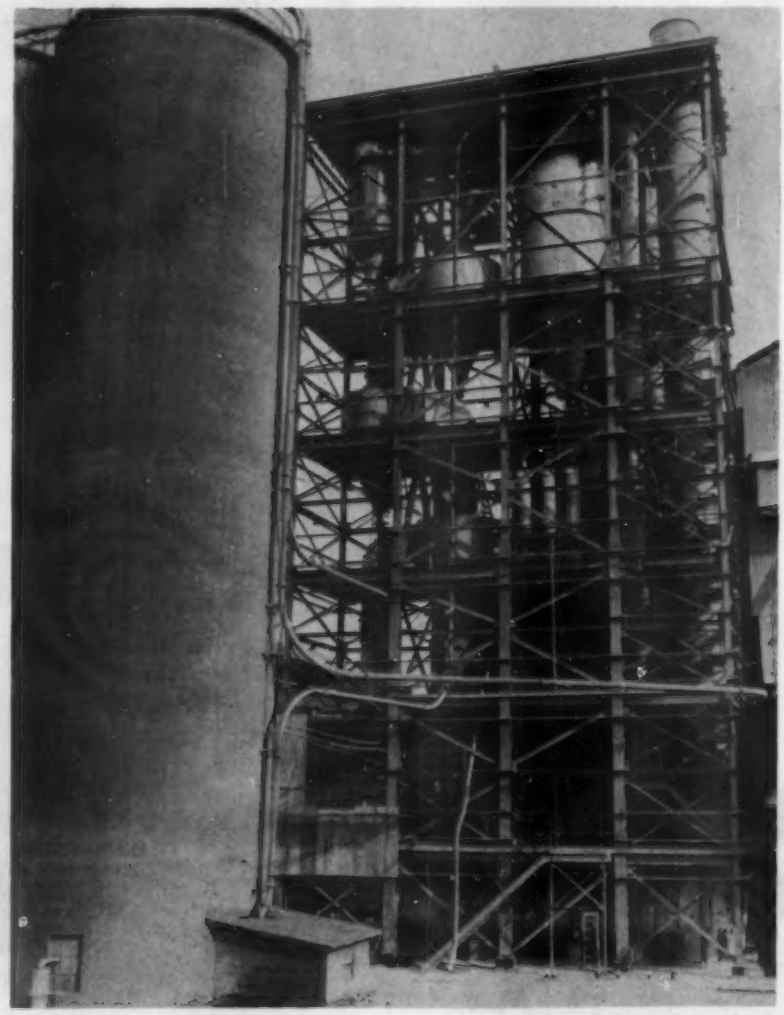
By WILLIAM M. AVERY

FOR the last year, the Allentown Portland Cement Company has had in operation at Evansville, Pa., the first American installation of the Humboldt suspension-type Preheater. Engineered by the Fuller Company, the installation has resulted in almost unheard-of efficiencies in the operation of a short rotary kiln which is entirely ordinary with respect to all appurtenant equipment except the preheater itself. On the basis of the carefully-studied results obtained at Evansville, it seems that the Fuller Preheater, Humboldt Suspension Type, the name under which the equipment will be marketed in the United States, will result in output between 150 and 175 percent of present capacities of existing short kilns, yielding at the same time efficiencies in the range of 600,000 to 650,000 B.t.u. per bbl.

The kiln, with which these provocative results have been obtained, was set up at Evansville to be operated in conjunction with a preheater essentially similar to an earlier German installation. It has a diameter inside of brick of 7 ft. and a length of 125 ft., and it was started up and operated without the preheater for a period of eight weeks in order to obtain comparative data. During this period, every precaution was taken to obtain top performance in order that later comparisons might be indicative of minimum rather than maximum potential. During eight weeks' operation without the preheater, output averaged 860 bbl. per day with a fuel efficiency of around 1,100,000 B.t.u. per bbl. With the preheater in operation, production was increased to about 1,500 bbl. per day, while fuel efficiency was about 650,000 B.t.u. per bbl.

In transferring heat from the kiln gases to the dry finely-pulverized kiln feed, the Fuller Preheater provides four cyclone collector stages in which contact is made between the gases and the feed. A staged counterflow system is employed and gas velocities are adequate to maintain the solid material in suspension in riser ducts leading to the next cyclone collector. The gases are cleaned by means of a dust collector and an exhaust fan, and these facilities also take care of the pressure differential across the system.

In the accompanying flow sheet, which shows the system in elevation, the original feed enters the dusty gas stream between Stages No. 1 and No. 2, from which point the gas stream carries the solids to the twin cones comprising stage No. 1. The double cone first stage provides for better dust recovery. Here the solids and gases are separated, the gases escaping through outlets above the cones to the final dust collector and to the exhaust fan. The solids pass through outlets in the bottoms of the cones, re-entering the gas stream between Stages No. 2 and No. 3. Picked up

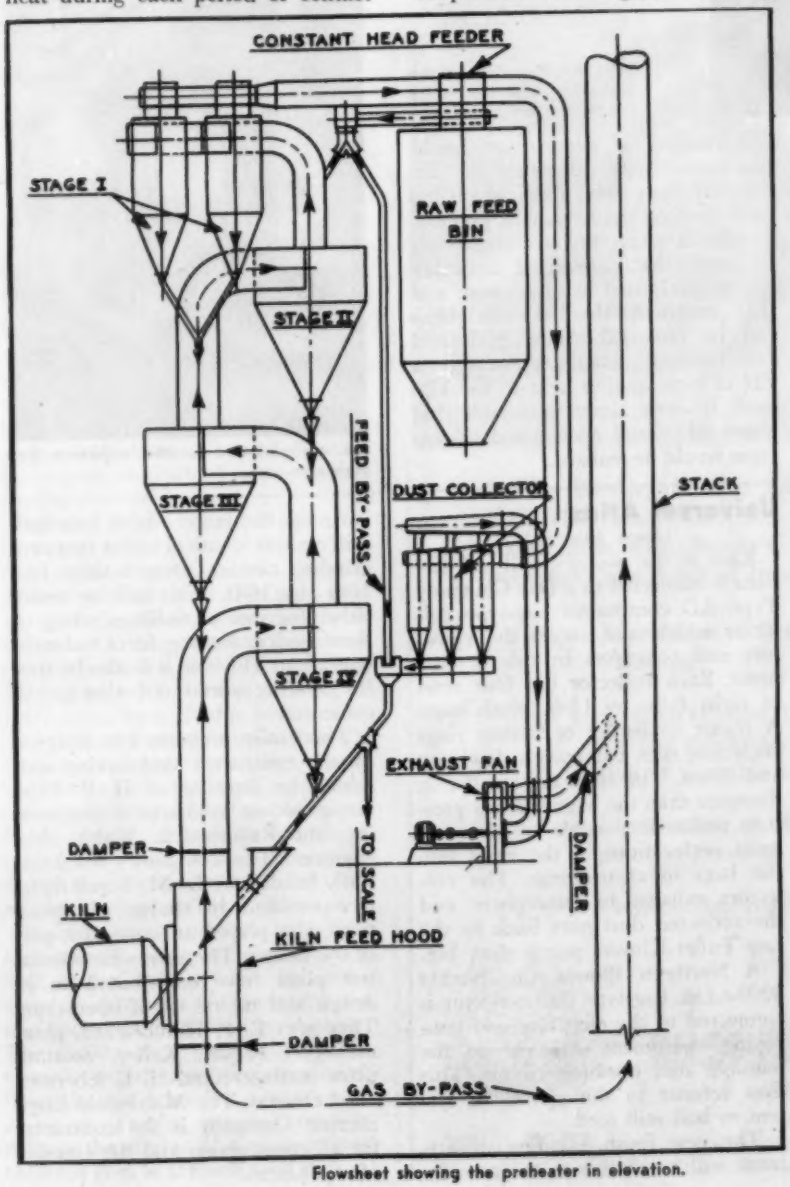


Side elevation of the suspension-type preheater at the Allentown Portland Cement Company's plant.

again by the high-velocity stream of gas, the solids are carried to the single cone which comprises stage No. 2. Here, and in the subsequent stages 3 and 4, the same separation of solids and gases takes place that was noted in connection with Stage No. 1. When the solids pass through the cone bottom outlet of Stage No. 4, they flow by gravity through the kiln feed spout directly into the kiln.

It should also be noted that as the solids move through the system from stage to stage, they come into contact with progressively hotter gases. The high thermal efficiency of the heat exchange is in a large measure due to the fact that, during the successive intervals of suspension, the fine particles are in intimate contact with the hot gases. Since the gas liberates heat during each period of contact with the solids, the temperature of the gas drops as it moves upward through the system, being highest at Stage No. 4, where the solids are also hottest, and lowest at Stage No. 1, where the entering solids contain only that amount of heat which carries over from the milling operations.

The following temperatures at the various stages in the Evansville preheater represent an average of 41 tests made with 60 percent of total waste gas passing through the preheater, and with feed entering the system at a temperature of 160 deg. F. from milling: at Stage No. 1, gas temperature 570 deg., solids temperature 550 deg.; at Stage No. 2, gas temperature 1015 deg., solids temperature 945 deg.; at Stage No. 3, gas temperature 1260 deg., solids temperature 1235 deg.; and at Stage No. 4, gas temperature 1500 deg. F., solids temperature at the instant of discharging into the kiln feed pipe 1430 deg. In this series of tests, the gas entering Stage No. 4 averaged 1504 deg., the kiln gas averaged 1890 deg., while the temperature of the gas at the intake side of the exhaust fan averaged 465 deg. Forty percent of the total kiln gas was permitted to by-pass the entire preheater circuit.



Flowsheet showing the preheater in elevation.

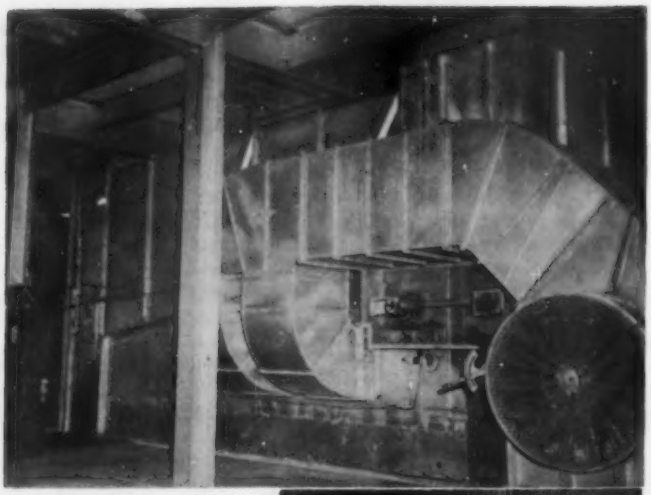
Because of the relatively low temperature involved in the initial stage of heat exchange, the cones and the appurtenant duct work at this point are of ordinary black steel. In the subsequent stages, however, all of the lower cone and the duct work are lined with 6-in., and Stages No. 2 and 3 with 5-in. cast refractory.

The kiln installation itself is in no way unusual, although brick lifters were installed for a distance of 12 ft. back of the feed end to prevent flushing. These are in the form of 4-in. square blocks raised 3 in. above the surface of the lining and on 12-in. centers. In a year of steady operation, they showed only normal wear.

A few other details of the installation are noteworthy. The entire preheater system is equipped with a by-pass flue through which kiln gases can be sent directly to the stack. The by-pass is used primarily on startups until such time as satisfactory combustion has been established. Similarly, there is a feed by-pass by means of which the raw feed may drop directly from the constant-head feeder to the kiln feed pipe during startups or whenever it is for any reason desirable not to use the preheater. A damper installed in the duct work just above the kiln was provided for bleeding into the system whatever quantity of atmospheric air might be required to keep the feed from becoming sticky. It has been found to be unnecessary.

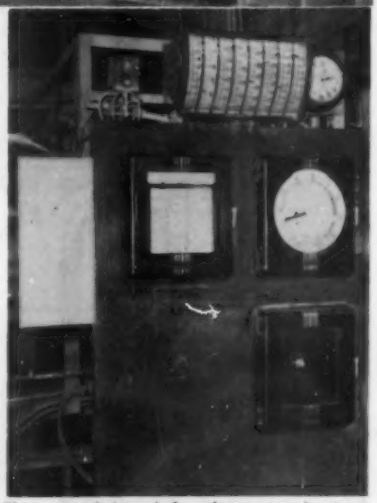
Final dust collection in the Evansville installation is by means of 12 relatively small cyclone collectors installed in four banks containing three units each. Dust recovered from these Cyclonettes is fed by screw conveyor directly into the kiln feed pipe. Since the temperature of the dust is around 265 deg. F., some heat recovery is also effected at this point in the circuit. In future installations it is planned to increase this effect by preheating dust ahead of the kiln.

The preparation of feed for the Evansville preheater kiln is in no way different from the preparation of feed for other kilns in the same plant. There is no evidence of segregation in the preheater either due to particle size distribution or to calcina-



Above: The inclined-grate-type clinker cooler following the rotary kiln.

Left: Another view of the preheater, with the rotary kiln in the foreground.



The control board for the suspension-type preheater.

tion of the stone. According to the operators, the clinker from the preheater kiln is consistently uniform, and the liter weight is slightly greater than for material produced in the adjacent 160-ft. kilns. Although the preheater was placed in operation late in May, 1953, there has to date been no necessity for maintenance work on the preheater.

There is reason to believe that in future applications of the preheater the number of stages will be determined to some extent by the length of the kiln and the back-end temperature at which the operation will be carried on. Another criterion will be to yield exit gases at temperatures within the best efficiency operating range of electrostatic precipitators, where the use of such equipment is contemplated. In this connection there is another advantage well worth noting in the operation of the preheater. By utilizing excess heat, the volume of exit gas is reduced by shrinkage and it is unnecessary to temper the gas with a large volume of atmospheric air. Since it is necessary in any case to reduce the temperature of exit gas ahead of an electric precipitator, it follows that smaller precipitator installations become possible with the operation of preheaters.

A primary measure of the effectiveness of the preheater installation at Evansville is the maintenance of exhaust gas temperatures in the range of 450 to 500 deg. F. This showing appears to compare quite favorably with the best waste heat boiler and recuperator installations.

Regardless of what other broad conclusions may ultimately be justified by the careful work which has been done on the Evansville preheater kiln, it seems to have clearly established that pulverized materials can be preheated in suspension, and that excellent thermal efficiencies can be obtained. Since preheated raw material actually constitutes a gift of high quality heat to the kiln itself, it seems almost inevitable that many additional operational advantages would be realized.

Universal Atlas

(*From page* 85)

Each of the two raw ball mill circuits is connected to a Day Company Type AC continuous bag-type collector which also serves the elevators and conveyors in this department. Each collector has four rows of eight 8-in. by 14-ft. cloth bags. A frame consisting of hollow rings encircling each bag travels slowly up and down. The rings are smaller in diameter than the bags and this pressure makes it possible to blow air from perforations in the rings into the bags to clean them. The collectors exhaust to atmosphere and the collected dust goes back to the raw Fuller-Kinyon pump dust bin.

A Northern Blower Co. Norblo 8200-c.f.m. bag-type dust collector is connected to the elevating and conveying equipment adjacent to the hammer mill crushing circuit. This dust returns to the conveying system to ball mill feed.

The new finish grinding department will be similar to the raw department but larger—with four ball-mill circuits identical to the two raw-grinding circuits. One of these four 10½- by 16-ft. mills will be usable either for raw or finish grinding on short notice, making for a balanced operation. This mill will also be used for grinding mortar and other special cements.

This entire program was designed by the company's engineering staff under the direction of H. P. Reid, vice-president in charge of engineering, and Raymond L. Walsh, chief engineer. The company's operating staff, headed by L. M. Funderberg, vice-president in charge of operations, also played an important part in the design. The men who operate this plant have contributed to its design and tuning up of operations. They are: E. F. Harchelroad, plant manager; R. M. Kelley, assistant plant manager; and H. E. Ebersole, chief chemist. The Macdonald Engineering Company is the contractor for all construction and the erection of equipment.

Hercules Improvement

(From page 79.)

two screw conveyors preceding the bucket elevators in the kiln feed systems.

The gases go through the flues to two of three Edgemoor 1128-hp. waste-heat boilers, the third boiler being connected to the four old kilns. These boilers are supplemented by a Babcock & Wilcox auxiliary coal-fired boiler rated at 60,000 lb. of steam per hour, which has a Detroit spreader stoker. Together these four boilers can generate up to 180,000 lb. of steam per hour. The steam goes to a powerhouse with a 6250-kv.-a. Westinghouse turbo-generator, and a 1450-kv.-a. General Electric turbo-generator which serves as an auxiliary.

The weighing device which records the amount of clinker coming from the cooler.

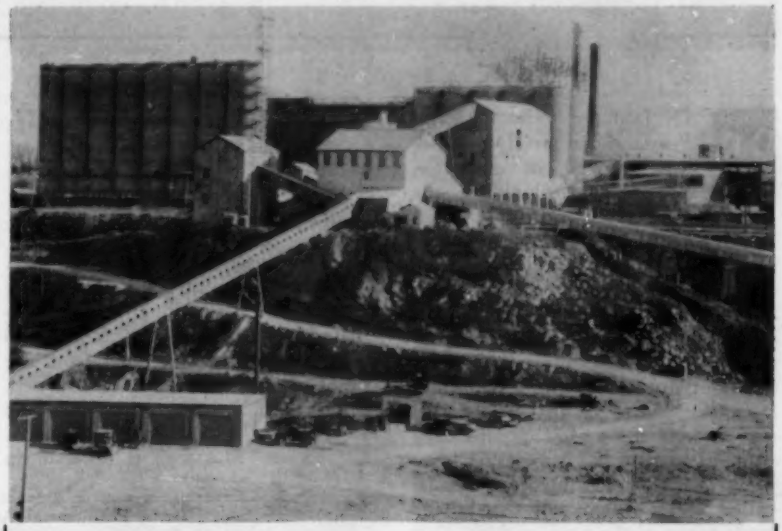
Clinker is discharged from each kiln into a 6- by 44-ft. Fuller Size 644 inclined grate cooler. Each is driven by a 10-hp., 1200-r.p.m. motor through a Reeves variable-speed reducer. Cooling air for the three cooling sections is provided by a New York Type NE blower driven at 1000 r.p.m. by a 100-hp. motor. The air is vented from the cooler through a stack, preceded by a settling chamber from which dust is fed by a screw conveyor to the clinker discharge. A thermocouple controls the depth of the clinker bed through the grate drive. Hammermill clinker breakers will be installed on both coolers.

A 14-in. drag conveyor in a concrete trough feeds the clinker from both coolers onto a 20-in. belt conveyor. A Merrick Weightometer on this belt records clinker production. The clinker then goes to a bucket elevator, which also receives clinker from the old kilns *via* a drag conveyor. A Traylor gyratory crusher reduces the clinker to a ¾-in. minus before it goes to the mill feed silos.

The entire plant is kept as dustless as possible with collectors connected to every major dust source. There are three Buell Van Tongeren 6-cyclone collectors, one after each of the three waste-heat boilers. Size No. 12½ A2 collectors follow the large kiln boilers, and a No. 11½ A2 follows the small kiln boiler. A Prat-Daniel Thermix dust collector follows the auxiliary boiler. Dust is taken to one of the raw-material blending bins from which it is fed uniformly back into the system.

A Pangborn bag collector is connected to the feed system at the surge bin, the elevators, the circulating screws, etc. A small Sly bag collector on top of the two kiln feed silos aerates them, relieving the pressure on the pneumatic pumping system.

This entire improvement and expansion program was designed by William R. Bendy, consulting engineer. Construction work was done by the Machin Construction Co., supervised by the company's staff under David P. Griffith, plant manager, and Edgar F. Rader, plant superintendent.



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IN January, 1954, Cimento Portland Branco Do Brasil, S.A., placed in operation Brazil's first plant for the production of white portland cement. This plant has a capacity of 100 metric tons per day and will supply a large part, if not all, of the Brazilian demand, making the country independent of foreign white cement imports.

The plant site is only 12 miles from the center of Rio de Janeiro and one-quarter mile from the new concrete highway connecting Sao Paulo with Rio. The plant site is called Irajá, which will also be the trade name of the new product. Two railroads, the Estrada de Ferro Leopoldina and the Estrada de Ferro Central de Brasil, are in the vicinity.

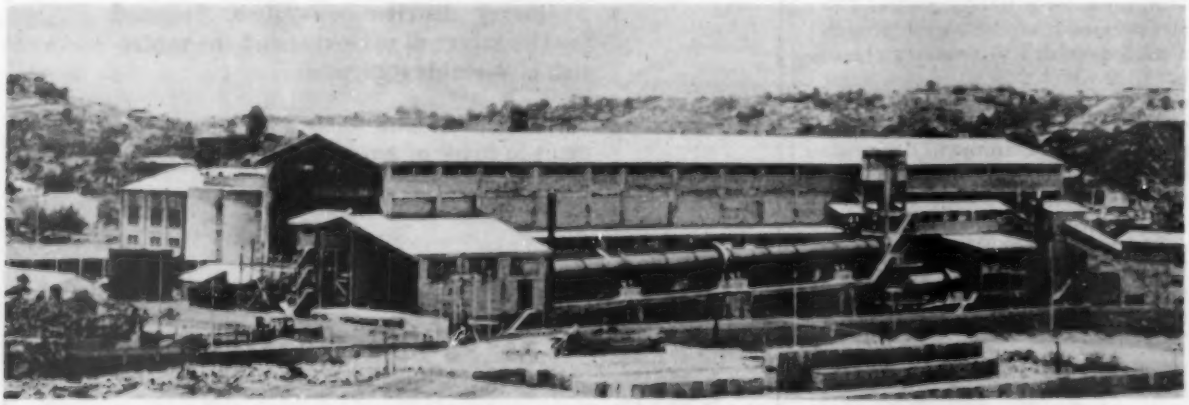
Raw Materials The raw materials available are pure white calcite, sea shells, kaolin, and pure white sand. Chemical analyses of the materials are given in Table I.

The calcite mine represents a huge deposit of pure white calcite estimated to contain over 60,000,000 tons and located 150 miles from the plant site, in the village of Macuco, State of Rio, one mile from the Leopoldina Railway. The calcite, loaded at Macuco, is loaded in trucks at the plant railroad siding in Parada de Lucas, 1½ miles from the cement plant. There are two roads leading to Macuco from the plant site, one 150 miles long and the other 125 miles. It is expected that some of the calcite will be hauled from the quarry to the plant by truck.

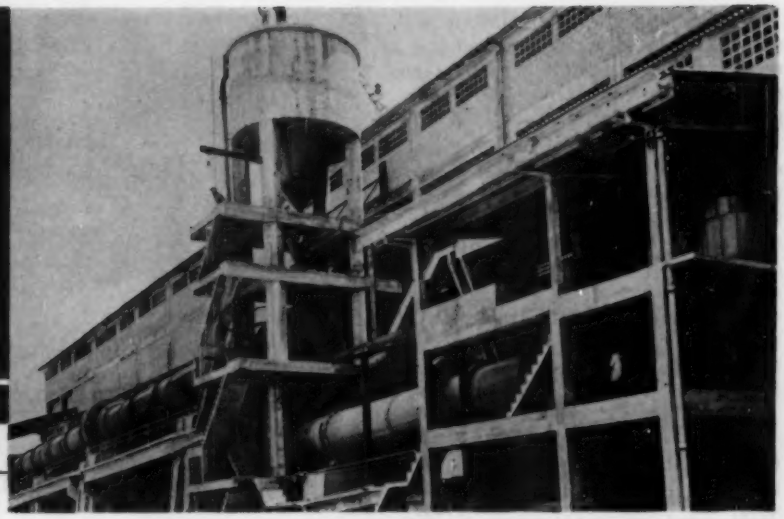
The company recently bought the mining rights for sea shells in a large area of Lake Araruama, 65 miles from the plant. Studies are being made as to the proper installation for dredging and washing the shells,

Table I—Chemical Analyses of Raw Materials

	Macuco Calcite (%)	Sea Shells (%)	Mage Kaolin (%)	Rio Novo Kaolin (%)	White Sand (%)
CaO	54.40	54.05	0.50	0.20	....
MgO	0.20	0.35	0.80	Traces	....
Al_2O_3	0.25	0.16	29.30	36.70	0.80
SiO_2	2.75	1.12	51.20	44.70	96.00
Fe_2O_3	0.25	0.12	0.30	0.12	0.20
Loss	41.85	43.60	15.20	16.30	0.60
	99.70	99.40	97.30	98.02	97.60



An overall view of Cimento Portland Branco Do Brazil, S.A., showing the 7-ft. 6-in. by 200-ft. four-support kiln, the 6- by 50-ft. rotary drier, and the storage building. The entire plant, together with allowance for future expansion, occupies a site approximately 460 ft. square.



which are to be used as raw material in place of the calcite. The sea shell deposits are estimated to contain 15,000,000 tons. The kiln will require about 50,000 tons of calcite or sea shells per year.

Kaolin will be supplied by two mines. The first, at Mage, State of Rio, is a sedimentary deposit of kaolinita located 31 miles from the plant. The second deposit is 200 miles from Rio near the Leopoldina Railroad station of Rio Novo. This deposit contains a very pure, high-grade kaolin with only 0.1 percent iron oxide.

The sand comes from two deposits of white sand close to the plant, the best belonging to the glass factory Covibra, on the other side of the Rio bay.

Table II shows analysis of finished cement. Table III shows the average compression strength of cement from official government cement testing laboratory reports.

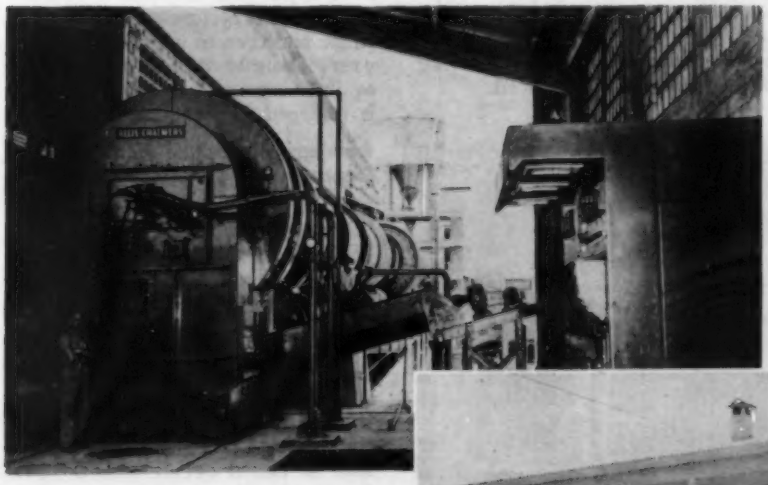
General Plant Design The plant was designed expressly for the production of white cement by the dry process and is not affiliated with any gray portland cement facilities. Processing equipment was selected for a daily capacity of 100 metric tons, with conveying equipment and storage facilities suitable for doubling the capacity at a future date.

Table II—Average Chemical Analysis of White Cement

CaO	65.10%
MgO	0.40
Al_2O_3	6.35
SiO_2	23.40
Fe_2O_3	0.35
Loss	1.80
SO_3	2.00
	99.40

Table III
Compression Strengths of 2" x 4" Cylinders Plastic Mortar 1:3 Mix

	White Cement P.S.I.	Brazilian Specification for Normal Portland Type I Cement P.S.I.
1 day	1705	....
2 days	2340	....
3 days	2820	1138
7 days	3620	2130
28 days	5320	3550



The kiln firing hood, as seen from the control panel. The kiln is fired with preheated fuel oil utilizing a high-pressure air-low-pressure oil burner.

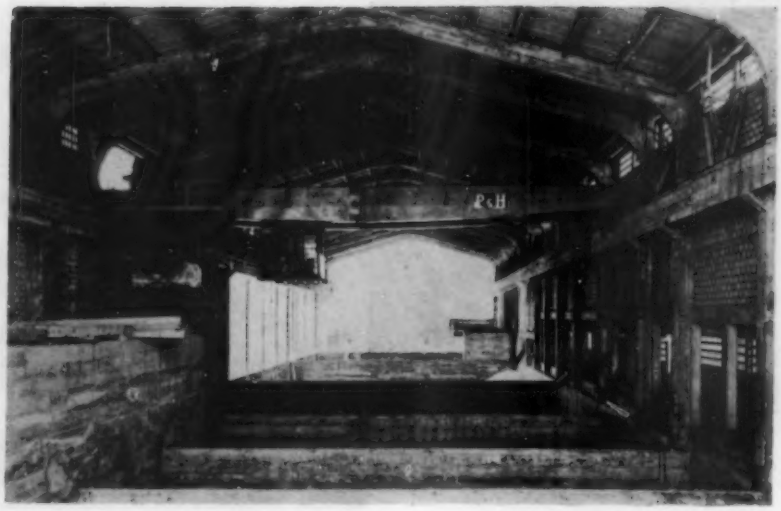
The office building and chemical laboratory. Strict quality control of white cement to supply the Brazilian demand originates in this building.

In planning the plant layout it was necessary to arrange the equipment and buildings for erection on property approximately 460 by 460 ft. square.

Consideration had to be given for the future addition of one kiln and two grinding mills, plus the possibility of a second bag-packing machine. Since the sources of raw materials are rather remote from the plant site, it was necessary to provide large storage facilities. The 67-ft. wide by 370-ft. long storage area is oversize for the plant capacity and provides for the following storage:

	Metric Tons
Calcite or limestone	16,000
Kaolin	6,000
Sand	5,000
Clinker	3,300
Gypsum	1,500

Crushing Department The crushing of raw materials is done in a 36- by 36-in. Jeffrey hammermill closed-circuited with a 4- by 8-ft. Ripl-Flo screen. All raw materials except sand are brought into the plant by truck and crushed before going to storage. Sand is delivered by truck and dumped directly into the storage area. Trucks will discharge into a 28-in. by 13-ft. Amsco apron feeder feeding the hammermill. Crusher product is elevated to the vibrating screen by two inclined belt conveyors. The plus ¾-in. product from the screen is spouted back into the crusher feed opening and the minus ¾-in. material is taken by belt conveyor to the wet storage area.



The raw materials storage building, showing the crane-mounted grab-bucket. Some of the raw materials stored here are pure white calcite, sea shells, kaolin, and pure white sand. Note the use of overhead concrete beams

Waste Heat Drying Department Crushed raw material is reclaimed from the wet storage area by a 1½-cu. yd. clamshell bucket operated from a 4½-ton Harnischfeger bridge crane. The crane to fill the dryer feed bin is located in the storage area.

A rack-and-pinion gate installed on the bin controls the feed rate to a belt conveyor running to the dryer feed spout. The 6- by 50-ft. brick-lined Allis-Chalmers rotary waste-heat dryer is driven by a 10-hp., two-speed motor, so as to provide speed regulation and permit adjustments in drying rates for varying moisture contents of the feed.

Hot waste gases from the kiln are used for drying the raw materials by passing them through the dryer. This eliminates the need for a separate fuel burning system and recovers valuable waste heat from the kiln gases.

The dried raw materials are returned to the dry storage area by means of a bucket elevator and belt conveyor equipped with a tripper for discharging various materials into their respective areas.

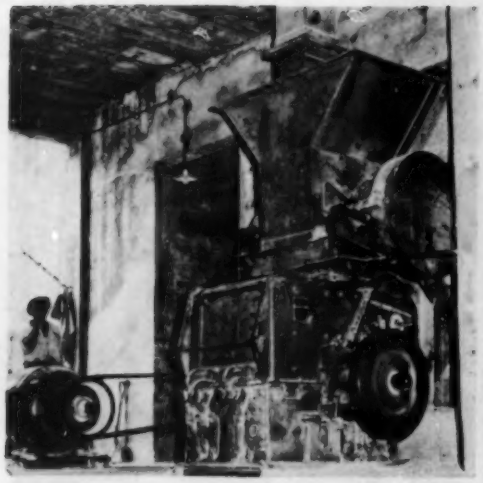
The exhaust gases from the waste-heat dryer pass through a 35,000-c.f.m. Buell cyclone-type dust collector and then to a No. 100 Sturtevant exhauster driven by a 60-hp. squirrel cage motor. Collected dust is returned into the dried product.

Raw-grinding Department The raw grinding of the cement raw materials is done dry in a 7- by 14-ft. Allis-Chalmers single-compartment ball mill driven by a 300-hp., 200-r.p.m. Allis-Chalmers synchronous motor. The motor is coupled to the mill driving pinion jackshaft through a Cutler-Hammer magnetic clutch.

Feedoweight scales proportion and feed each of the raw ingredients to the 7- by 14-ft. mill, which is operated in closed circuit with a 12-ft. Sturtevant air separator. The finished raw material is conveyed to the blending and storage silos by a bucket elevator and screw conveyor. Air separator rejects are returned to the feed end of the mill by a screw conveyor.

One feature of the 7- by 14-ft. mill is its spiral lining, which causes the grinding balls to segregate ac-

Cement storage silos, located between the grinding mill building (left) and the packhouse (right). This photograph was taken during the construction period. Raw-grinding of cement materials is done dry in the grinding mill building in a single-compartment ball mill equipped with spiral liners.



Left: This hammermill, closed-circuited with a screen, is used for raw material crushing. All raw material is crushed before going to storage, with the exception of sand, which is dropped directly into the storage bin.

The master kiln control system for the 7-ft. 6-in. by 200-ft. rotary kiln was kept as simple as possible. This control panel is located adjacent to the firing hood.

cording to size, the larger balls tending to locate at the feed end and smaller balls to move toward the discharge end. This arrangement permits the big balls to work on larger particles of material and the small balls on the finer portions of the mill load. The spiral liners also help to propel material through the mill, making it possible to operate at a high circulating load; the air separator thus rapidly removes material ground to size and reduces overgrinding in the mill. This system permits full utilization of mill power and maximum product capacity.

A Fuller-Kinyon pumping system is used to recirculate the ground raw materials for blending purposes and convey it to the kiln feed bin.

Kiln Department A unique system of two bins is used to feed the kiln. A large feed bin is located over the feed end of the kiln to serve as storage. Directly beneath this storage bin is a small surge bin feeding into the kiln feed spout. This surge bin provides a relatively constant head of material on the kiln feeder.

Both the storage and surge bins are provided with rotary feeders. The feeder on the storage bin is actuated by high- and low-level indicators in the surge bin and operates intermittently to keep a relatively-constant head of material on the kiln feeder. The speed of the kiln feeder is synchronized with the speed of the kiln by an Allis-Chalmers synchronous tie system.

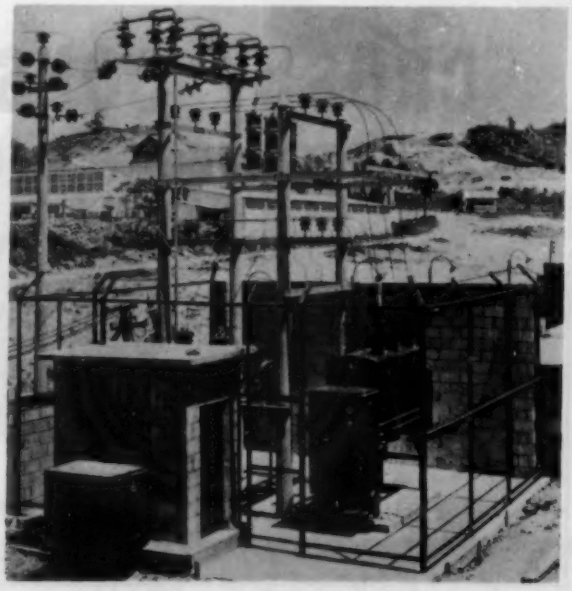
The 7-ft. 6-in. by 200-ft. four-support Allis-Chalmers kiln is installed on a slope of 3/8 in. per foot and is driven at a maximum speed of 1.2 r.p.m. by a 30/40-hp., d.-c. motor. A gasoline engine auxiliary kiln drive is installed to turn the kiln slowly in the event of a power failure and to spot the kiln during installation of brickwork. The kiln shell is lined with 6-in. refractory brick throughout.

Fuel oil utilizing a high-pressure air-low-pressure oil burner is used to fire the kiln. Oil is heated with steam from a 30-hp. Kewanee boiler. The oil-burning system pumps, heaters, and boiler were furnished with sufficient capacity to handle a second kiln.

The kiln control sytem is as simple as possible, consistent with good rotary kiln practice. An automatic control system is utilized to control the draft at the firing hood of the kiln by positioning the induced draft fan outlet damper. Bleed-in dampers with pushbutton-actuated drive units are provided for bleeding in air between the kiln and the waste-heat dryer and at the feed end of the waste-heat dryer. The first of these dampers is to temper the gases going to the waste-heat dryer in order to avoid overheating of the dryer product. The second bleed-in damper protects the dust collector and exhaust fan from excessively high exit gas temperatures.

There is also a burning-zone temperature indicator-recorder; an oil-flow indicator-recorder; a kiln firing hood and feed end draft indicator; and a strip chart temperature indicator-recorder for temperatures at the induced-draft fan outlet, for waste-heat dryer gas, waste-heat dryer product, and kiln exit gas. A horn system is provided to sound in the event of excessively high gas temperature going to the dust collector and fan.

A 5- by 40-ft. Allis-Chalmers rotary dryer is installed to handle the clinker discharged from the water quencher. The dryer is oil fired and

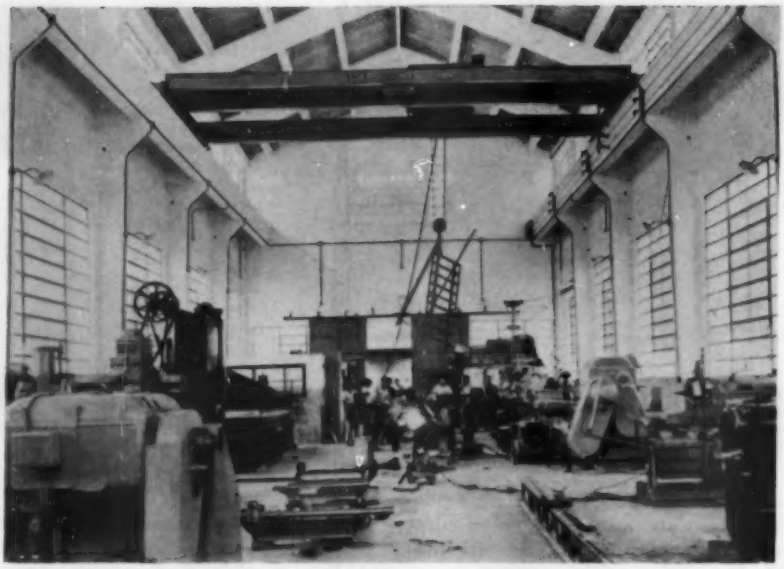


The unit substation feeds 440 volts, 50 cycles, to the various departments in the cement plant. Power is purchased from a utility company and brought into the plant at 3 phase, 50 cycles, 25,000 volts.

fitted with steel plate lifters to shower the clinker through the drying gases. It is possible to regulate the screw speed and water level in the water quencher so that the clinker will be discharged containing sufficient residual heat to drive off moisture with little, if any, firing of the dryer. The dried clinker is conveyed to storage by drag conveyor and bucket elevator.

Clinker-Grinding Department The clinker-grinding department is a duplicate of the raw-grinding section. The 7- by 14-ft. ball mill is driven by a 300-hp., 200-r.p.m. synchronous motor and operated in closed circuit with a 12-ft. Sturtevant air separator. Finished cement is conveyed to the silos by bucket elevator and screw conveyor.

Packhouse Cement is drawn from the silos by a screw leading to a bucket elevator in the packhouse building. A screw conveyor takes the bucket elevator discharge and conveys it to the bag packer feed bin. The conveyor screw is encased in a screen for that portion extending over the packer bin. The cement drops through the screen into the bin, while oversize foreign matter is conveyed out the discharge end of the screw to waste.



The machine shop, photographed while it was being readied for operation, is fully equipped with modern machines for making all routine and maintenance repairs.

A tube packing machine is used to fill 50-kilogram bags, which are standard in South America. The packer feed bin is provided with a set of high-low level indicators automatically to start or stop the feed to the bin.

Filled bags drop to a 30-in. wide wire mesh shuttle conveyor, mounted on tracks, which can be moved to extend out of the packhouse to truck bodies to facilitate loading. In the first two months of operation 122,000 sacks of cement were shipped.

(Continued on page 118.)

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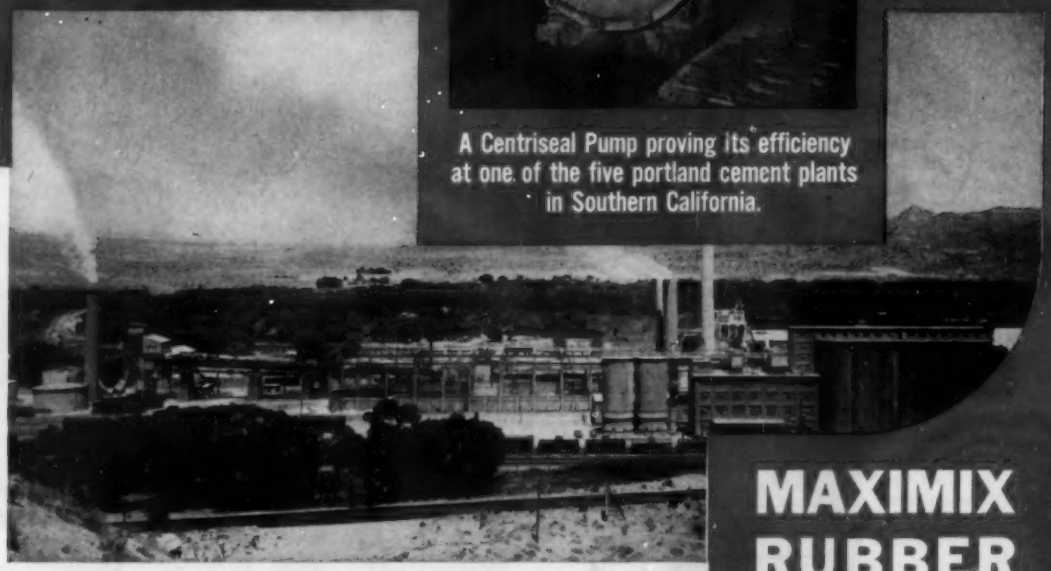

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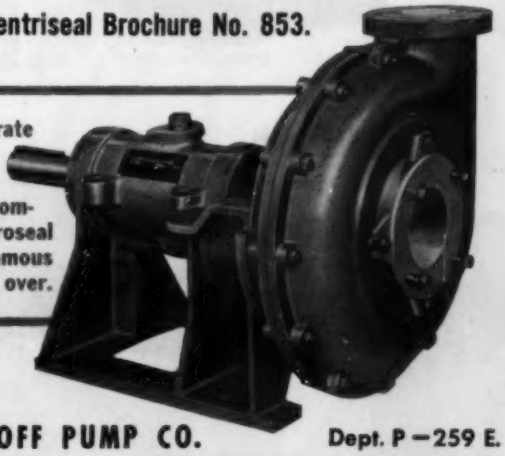

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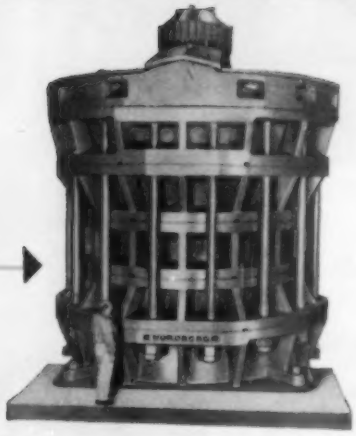

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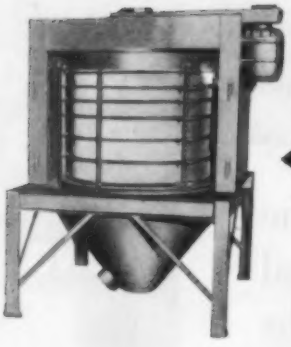

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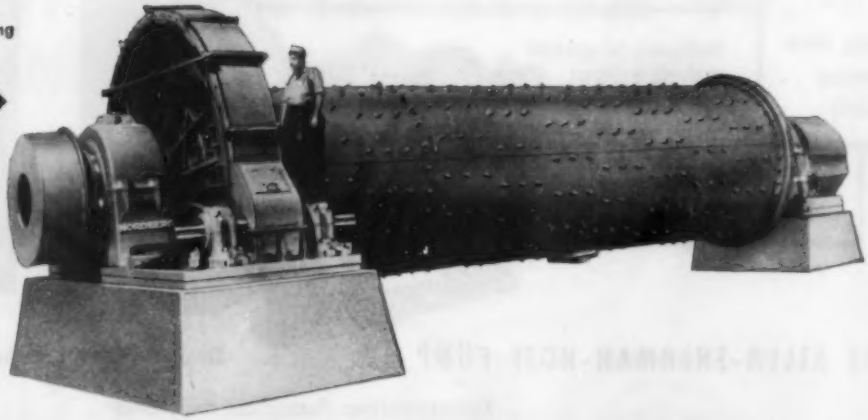

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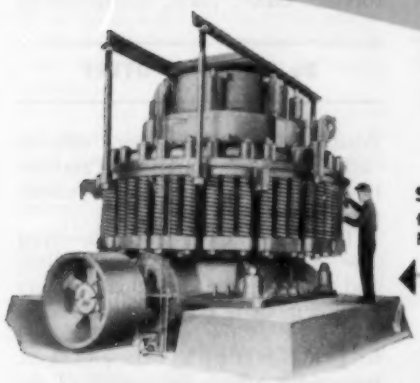

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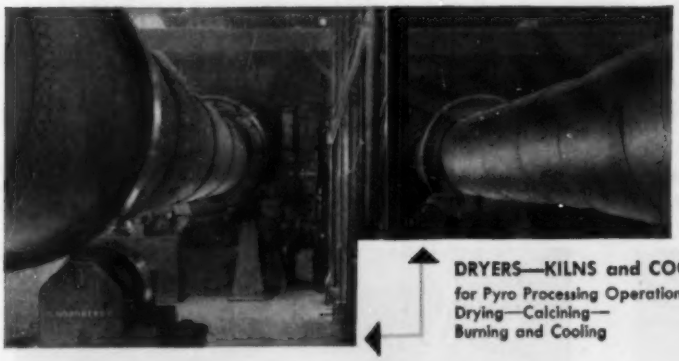

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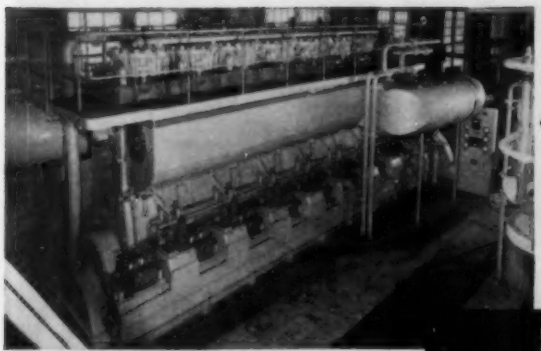

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Cemento de Mixcoac–Mexico
Cemento Portland del Bajio, S.A.–Mexico
Cementos de Chihuahua, S.A.–Mexico
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Whitehall Cement Mfg. Co.–U.S.A.
Whites South African Portland Cement Co., Ltd.–South Africa
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New Quarry and Crushing Plant of Southwestern Portland Cement Co., Victorville, Calif.

Latest phase of long-range improvement plan

● The secondary crusher building and the transfer house at the Southwestern Portland Cement Company's Victorville plant. The quarry and the crane housing over the primary crusher may be seen in the distance.

● Below, left: Much of the drilling at the Black Mountain quarry is done by this modern blast-hole drill.

● Below, right: This view from the primary crusher shows the conveyor to the surge pile and the parallel recovery conveyors leading to the secondary crushing and screening plant.

another ON THE SPOT report

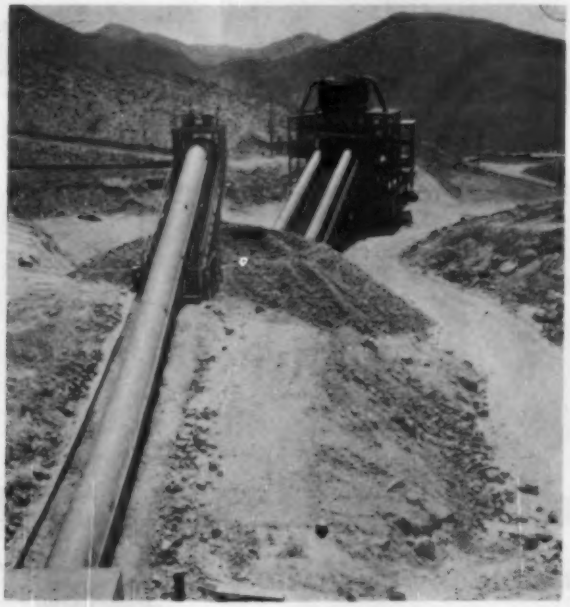
HAVING within the last year improved and increased production by installing additional burning and grinding facilities at their Victorville, Calif., plant, Southwestern

By HARRY F. UTLEY

Portland Cement Company officials early in 1954 completed another phase of a long-range improvement program.

This latest development involved raw material supply, preparation, and storage, the principal feature being a modern, high-capacity crushing plant at the quarry. Designed to yield 1,000 t.p.h. of minus 1-in. stone with a high proportion of desired fines, the new installation is exceeding expectations in both the quantity and quality of mill-feed material.

Plans for improving the raw-material phase of the Victorville operations were initiated 5 or 6 years ago. At that time, three deposits were being utilized: (1) the original



quarry, situated some 6 miles from the plant, which then supplied low-grade and siliceous rock; (2) a so-called "reserve" quarry, approximately 11 miles from the plant, containing mostly pure calcium stone in large quantity (difficult to quarry because of intrusive materials); and (3) the Black Mountain deposit near the reserve quarry, which contains almost unlimited amounts of "cement-rock" type limestone.

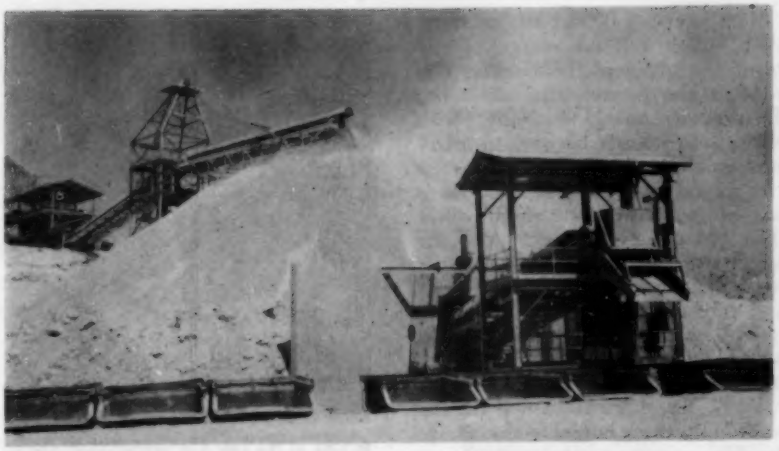
The company-owned railroad ran all the way to the old quarry and approximately half way to the other quarries, and hauling to the terminus of the railroad was *via* truck-trailers carrying about 60 tons. The loaded trucks ran down hill to the rail-loading station; the grades were as steep as 8 percent in some places.

As a result of intensive study, it was decided to adopt the following program:

(1) The original quarry was to be abandoned because of its remoteness and new sources of silica rock were to be located closer to the Black Mountain deposit.

(2) After weighing various transportation methods (rail, trucks, conveyors) it was felt that the railroad would best and most economically serve the relatively low daily tonnage demand over the average distance of 15 miles to the plant.

(3) Proper blending of raw material should be obtained by selective quarrying combined with layering of the stone in storage to facilitate blending. It was proved by core drilling that the chemical composition of the Black Mountain deposit was satisfactory to a degree that permitted closing down the "reserve" quarry and concentrating on quarrying at Black Mountain.



● The surge pile and the high-speed conveyor which loads the railway cars with minus ⅝-in. stone for delivery to the cement plant 15 miles away. Standard gondola cars are used. The special cars shown here were being switched on the track when this photograph was taken.

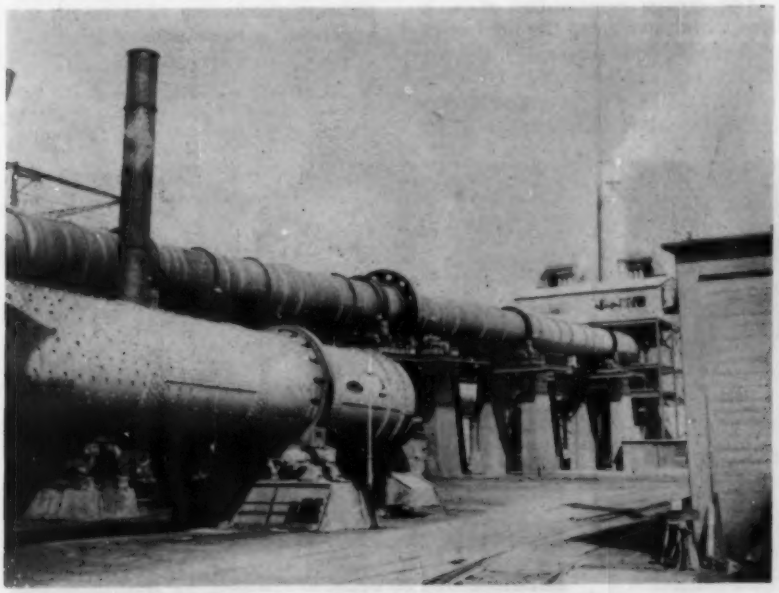
With the development of the long-range program, and in anticipation of establishing a complete crushing plant at the new quarry, the first step to be undertaken was to increase rock-storage capacity at the plant and to provide a simple system of blending by feeding the rock into the 500-ft.-long covered storage area. This was accomplished by conveyor and tripper, a method which places the stone in storage in thin, horizontal layers. The material is then recovered in two parallel tunnels through gates located about 15 ft. apart. In the recovery operation the rock is withdrawn by opening the first gate at the far end of the storage building and when the material is run out opening the second gate, and so on. Thus, by layering the crushed stone horizontally and withdrawing it in vertical sections, excellent blending is obtained. Separate compartments in the raw-storage structure contain aluminates, silica, iron pyrites, and high-calcium stone, and these additives are also blended onto the tunnel belts by proportioning feeders. A new track hopper and an inclined belt-conveyor to the storage building have just been completed.

Other steps in the program included relocation and extension of the railroad to the Black Mountain quarry, and building the new crushing plant there.

Formerly the stone all went to the plant for crushing. This required railroad cars of extra-heavy construction to bear the brunt of loading the large lumps. Crushing the stone down to raw-mill size at the quarry, now permits the use of relatively lightweight bottom-dump gondola cars. The use of lighter cars represents a considerable reduction of dead weight. Formerly the live-to-dead-weight ratio of the cars was about 1½ to 1; now it is 5 to 1.

The Black Mountain quarry is being developed to utilize long faces and to load with two or more relatively small shovels for better blending of the stone. Eventually the mountain deposit will be benched on 60-ft. levels. Mainstay of the drill equipment is a Joy Champion rotary drill. Two Bucyrus-Erie churn drills also are in service. The blasting technique includes millisecond-delay shooting. Good fragmentation, is obtained, requiring the minimum of secondary shots.

● The new 10½- by 330-ft. kiln is the seventh at the Victorville plant. It went into operation late in 1953. In the foreground is the rotary cooler on one of the older and shorter kilns.



The new 1,000-t.p.h. crushing plant takes full advantage of the terrain, and keeps the hauling distance at the quarry at the minimum. It provides ultra flexibility, with surge pile storage between primary and secondary stations and between the secondary crusher and the loading-out point at the railroad dock. The belt-conveyor system from the quarry to the car-loading point is about one-half mile long, including the return circuits.

The Marion electric shovels load special trucks, each of which carries about 30 tons in 3 compartments, or "skips". These are actually hydraulic end-dump truck bodies mounted side by side crosswise on the truck chassis to achieve side dumping at the primary crusher. Each skip is discharged separately to avoid choking the crusher, an Allis-Chalmers 42-in. Superior gyratory. The primary crusher is set to break the stone to minus 5½-in. A novel feature is that the product goes to the belts without benefit of mechanical feeder. Baffled stone boxes serve as a rock ladder, gently lowering the material to the conveyor leading to the primary surge pile. The pile has a live-storage capacity of 2,000 tons. This primary conveyor is 48 in. by 287 ft. and inclines as it emerges from the crusher tunnel to build the surge pile. Traveling at 415 f.p.m., it has a carrying capacity of 1,800 t.p.h.

Recovery from the pile is flexibly effected by parallel tunnel belt-conveyors, each independent of the other and each fed by its Jeffrey-Traylor 4- by 8-ft. electric-vibrating feeder. The two conveyors deliver to the secondary crusherhouse, the first pass being over a pair of identical Robins Vibrex 5- by 14-ft. double-deck

● The two reversible hammermills which reduce the minus 5-in. rock to a minus ⅝-in. finished product. These operate in closed circuit with the screens.

● One of the new 4-in. rubber-lined pumps being substituted for the old slurry pumps.

scalping screens with 3-in. and ¾-in openings. All the rejects slide to a pair of 600-hp. Pennsylvania reversible Impactors; the screen throughs comprise a finished product. The Impactors are in closed circuit with two Robins 6- by 12-ft. single-deck screens in tandem, both equipped with ¾-in. woven-wire cloth. All screens and cross-conveyors are fully enclosed and suction-connected by piping to a pair of Norblo cloth-bag dust arrestors on the crusher-house roof; the fines shaken out of the bags join the minus ¾-in. finished product coming through the screens. The finished stone eventually is delivered to the plant's longest belt-conveyor, 36 in. by 914 ft., for transfer to the stacker, which builds up the final surge pile near the rail-loading station. Capacity of this conveyor matches production capacity, 1,000 tons per hr., at a travel speed of 520 f.p.m.

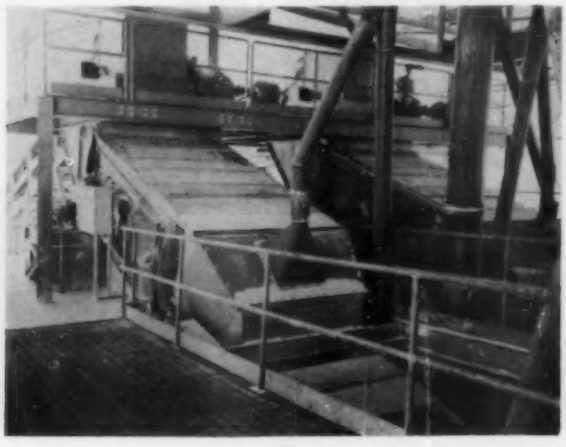
The completely crushed stone is then withdrawn from the final surge pile (8,000 tons' capacity) by two Jeffrey-Traylor feeders which operate in parallel over a high-capacity (48-in. by 161-ft.) loading belt which can fill a 70-ton-capacity car in approximately 2 minutes at a belt speed of 500 f.p.m. Provision is being made for a second surge pile at the rail terminal to handle low-grade material, aluminates, and silica rock.

The opening of the new crushing plant early this year was preceded late in 1953 by the completion of the company's seventh rotary kiln, an Allis-Chalmers 10½- by 330-ft. unit, followed by a No. 633 Fuller grate cooler. Finish-grinding capacity has also been increased by the recent addition of an Allis-Chalmers 10½- by 16-ft. ball-mill. Some of the old slurry pumps are also being replaced by new type Allen-Sherman-Hoff 4-in. rubber-lined pumps, which require no gland water. At present, additional finished storage silos are being constructed. The grounds have been attractively landscaped, and a new plant office, a modern change-house, and a locker-room building were completed.

Production capacity at the Victorville plant is now about 4,000,000 bbl. annually, twice what it was during the years preceding World War II. Other plants of the company are operated at Fairborn, Ohio, and El Paso, Tex. Main offices are located in the company's own building on Wilshire Blvd. in Los Angeles.

Nearly 20,000,000 short tons of salt were produced in the United States in 1952, according to reports of producers to the U. S. Bureau of Mines. This was slightly less than the record output in 1951. The decline consisted largely of a decrease of a little more than 500,000 tons of salt in brine. This was a reflection of decreasing production of soda ash for which salt is the raw material.

● All screens are enclosed, and the dust is drawn through piping to a bag house on the top of the secondary crushing building.



First East African Cement Plant Supplies Owen Falls Dam Project

ONE of the problems facing the builders of the 2,500-ft. long Jinga Dam at Owen Falls, Uganda, East Africa, which is to compound the waters of the Upper Nile to generate electricity for the Uganda Protectorate, was the difficulty of obtaining cement. Local limestone was unsuitably high in phosphate content and importing cement from abroad had the drawback of extremely high shipping costs (averaging nearly $10 per bbl.). The Building Research Station of the British Department of Scientific and Industrial Research recommended to the Uganda Development Corporation, Ltd., the building of a local cement plant. The plant is situated at Tororo, 10 miles west of the Kenya-Uganda boundary and 200 miles from Kampala, the capital. The plant went into production in January, 1953, using local limestone of inferior purity and local clay to supply the necessary silica and alumina. Since neither gypsum nor fuel oil for firing the cement kiln is available in Uganda, they are imported.

The limestone used has a high iron and phosphate content, and first indications were that the proportions of these minerals present would cause considerable difficulty in manufacturing cement complying with the British Standard Specification No. 12 of 1947 (as amended to 1952) for portland cement. However, experience has shown that by careful control of the blending and firing temperature it is not only possible but economical to produce a cement of the required standard with quantities of iron and sulphate in excess of those found in imported brands.

The strength of the resulting product far exceeds that required by the specification; and the setting times, both initial and final, are well within the limits. Concrete made with this cement takes longer to reach the final hardening than imported brands, a distinct advantage in a tropical climate, and it is slightly darker in color than other brands, due to the high iron content.

A second process developed by the Station makes it possible to remove the 2 percent phosphate content of the limestone entirely, so as to make this ingredient available as a by-product from which fertilizers could be manufactured.

The maximum capacity of the plant is rated at 160,000 tons of cement annually, but the monthly output of cement clinker has so far not exceeded 3,500 tons, nor is this figure likely to be increased until certain modifications have been made in the induced draft in the cement kiln. Nevertheless, the total output to date has been limited by the competition of imported cements; but indications are that with increased efficiency the consequent reduction in production costs will enable this competition to be met.

The largest customer for the products of the company during its first year of production has been the Owen Falls Construction Company Limited which used more than 16,000 tons of Tororo cement in the buiding of the Owen Falls Dam, the remaining 36,000 tons being imported from Europe.

In 11 months of operation in 1953 this plant produced 26,211 tons of cement clinker from which 16,913 tons of cement were made.

The basic price of bagged cement ex-works has been gradually reduced from 330 shillings ($46.20) per long ton, to its present price, in April, 1954, of 285 shillings ($39.90) ($6.77/bbl.).

Relative to the quality of the cement, J. T. Simpson, chairman of the board of the company, said, "In achieving this high quality it is necessary specially to treat much of the Tororo limestone. We start off, therefore, with an inferior raw product. Additionally, there is the iron content of the stone which, while not an impurity as such, makes burning more difficult to achieve the full rated capacity of the kiln."

• An aerial view of the cement plant built by the Uganda Development Corp. at Tororo. These facilities, in production since January, 1953, turn out satisfactory cement, despite the fact that the limestone used has a high iron and phosphate content. More than 16,000 tons of cement made in this plant went into the building of the Owen Falls Dam.

Eastern Corporation Cited By N.Y. Water Pollution Board

The New York State Water Pollution Board has taken the first punitive action in the five years of its existence to enforce anti-pollution laws.

The board served an order assessing Dunraven Quarries Inc., Middletown, $500 for failure to obtain approval of plans for the discharge of wastes from a quarry and rock crushing plant. The company was also enjoined from discharging wastes from the plant into state waters until plans are approved.

William H. Rowand Honored For Work in Field of Steam

The Newcomen Medal, given only three times before in the history of the United States branch of The Newcomen Society, was awarded recently to William H. Rowand, vice-president of The Babcock & Wilcox Company of New York, at a joint meeting of the society and The Franklin Institute, in honor of Benjamin Franklin's birthday.

Foremost among Mr. Rowand's contributions to steam progress, which led to his nomination for the medal, was his invention in 1936 of the cyclone steam separator. This device effected a thorough separation of steam and water in boiler drums, assuring circulation of boiler water even at very high pressures. It also acted to provide consistent and uniform delivery of clean, dry steam.

Closed-Circuit or Open-Circuit Grinding?

Part I

By H. BÖRNER*

CLOSED-CIRCUIT grinding has found extensive application in Germany for cement raw materials and coal, using either air-swept mills or mills with mechanical air-separators. In that country there is still considerable doubt, however, about the suitability of closed circuit for cement grinding; it is felt by many that air-separator cement is a product of too uniform grain size so that the gain in power economy is obtained at the expense of strength, and that the power consumption actually is the same for cement of the same quality, whether ground in open or closed circuit.

This is doubtless correct for an air-swept mill or perhaps even for a short mill in closed circuit; it is not correct, however, when a sufficiently long grinding path is provided before and after the air-separator, when the efficiency of the air-separator is low, and when the circuit and circulation balance have been adjusted for the desired end-product. The fact is frequently overlooked that the success of a closed-circuit grinding system depends on the physical properties of the finished product.

The lack of knowledge of the limitations of closed-circuit grinding of cement has been caused by the absence of systematic operational investigations. Only fragmentary, and often contradictory, information has been published, which does not permit direct comparison with grinding in compartment mills.

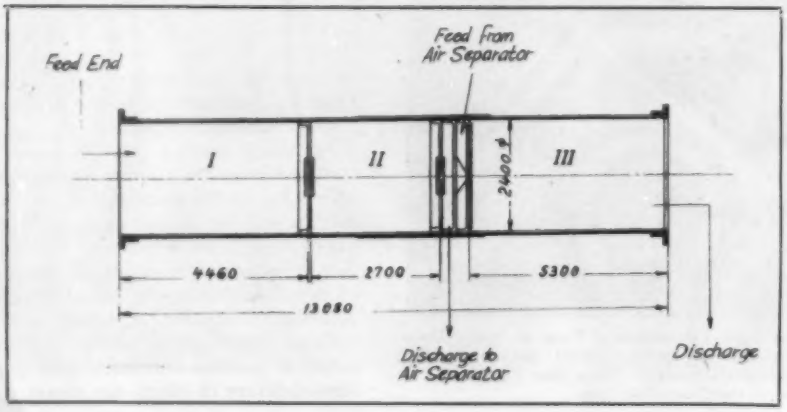
It is well known that the common American method is two-stage grinding in closed circuit with air-separator, with a power consumption of 35-45 kw.-h./metric ton (5.5-7.2 kw.-h./bbl.); in Germany it is necessary to use 50-60 kw.-h./metric ton (8-9.6 kw.-h./bbl.) for grinding to the same fineness in compartment mills. This usually results in the conclusion that the Germans consider excessive fineness unnecessary (ref. highway construction), or at least only necessary for high-early strength. A comparison of normal fineness shows that the American Type I cement is produced with 25 percent more specific surface (3,600 against 2,900 Blaine), and Type III with 15 percent more (5,400 against 4,800 Blaine), than the corresponding German cements. Offhand, it would follow from this that closed-circuit grinding must be advantageous at higher finenesses.

The cement plant at Watenstedt(1) was designed to produce blast-furnace cement from available slag by grinding to high fineness; in addition to a three-compartment mill, 2.4m. (7 ft. 9 in.) in diameter and 13m. (43 ft.) long, an identical mill was at the same time installed in closed circuit.

Fig. 1 shows the arrangement of the three-chamber mill designed for air-separation. It consists, so to speak, of a two-chamber preliminator followed by a single-chamber finish mill combined in one cylinder. The grate at the end of the second compartment is built as a discharge diaphragm and the inlet grate for the third compartment is equipped with feeding scoops. Because of this double partition, the length of the third compartment is 0.5m. (1 ft. 6 in.) shorter than in the straight compartment mill. A mill of similar design was delivered by Krupp to a cement plant during the war, but was not installed as contemplated.

(1) Note: Bibliographic references will be listed at end of Part II of this article.

Fig. 1: A 7-ft. 9-in. by 43-ft. compartment mill for operation with an air separator.



This grinding installation, with two parallel mills of the same size, offers thus an ideal opportunity for comparison, and the interest on the part of the cement industry in learning about the results is easily understood. The author realizes that the three-month test period used for parallel operation is insufficient for complete comparison, since only one of the five alternatives, Alternative No. 3, shown in Fig. 2, has been studied. This is the circuit most similar to the grinding method which until now has been used in America.

Conclusions regarding closed-circuit grinding of slag-cement may well indicate a trend in the grinding of a homogeneous material such as portland cement clinker although they can only be confirmed through full-scale operational trials. By operational trial is meant a longer grinding period, under constant observation and maintenance of all variable factors. Isolated grinding tests are normally not sufficient; they do not show the relations between these factors such as obtained from an examination of a great number of observations under actual operating conditions. Much of the confusion about closed-circuit grinding may, in fact, be traced to grinding tests in which the optimum grinding conditions could not be ascertained. In spite of the incompleteness of the Watenstedter operational tests, they may nevertheless throw some light on the controversial subject of closed-circuit grinding.

Before discussing the grinding results obtained, it will be well to review the various circuits in which the Watenstedter equipment may be operated.

As shown in Fig. 2, both Alt. 1 and Alt. 2 have the third compartment in open circuit. In Alt. 1, all the tailings are ground in compartment 3 and combined with the fines

* Translated by J. Walter, Emmlsa, Paris, France, and C. F. Clausen, Chicago, from an article in the August, 1952, issue of *Zement-Kalk-Gips*.

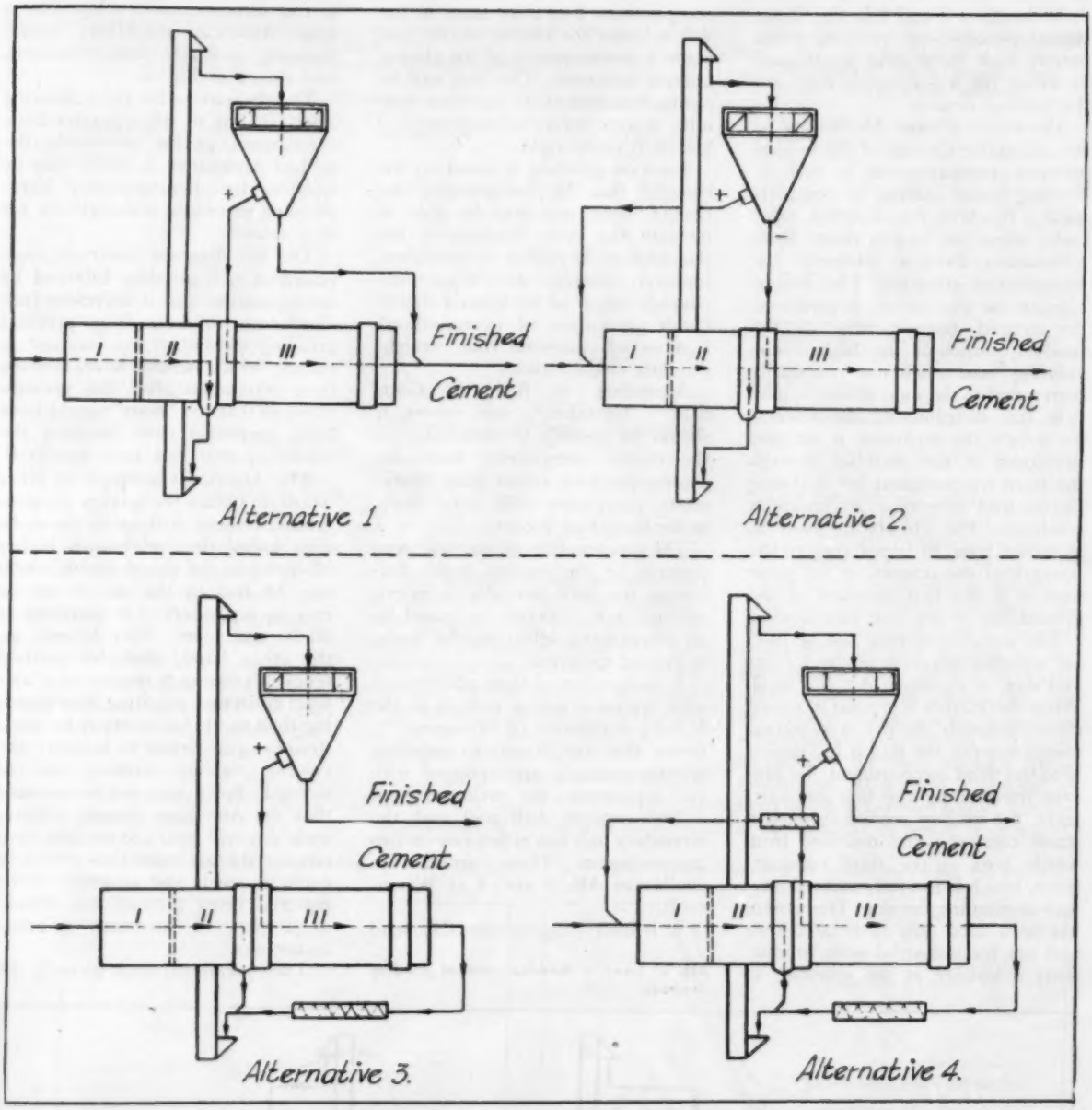
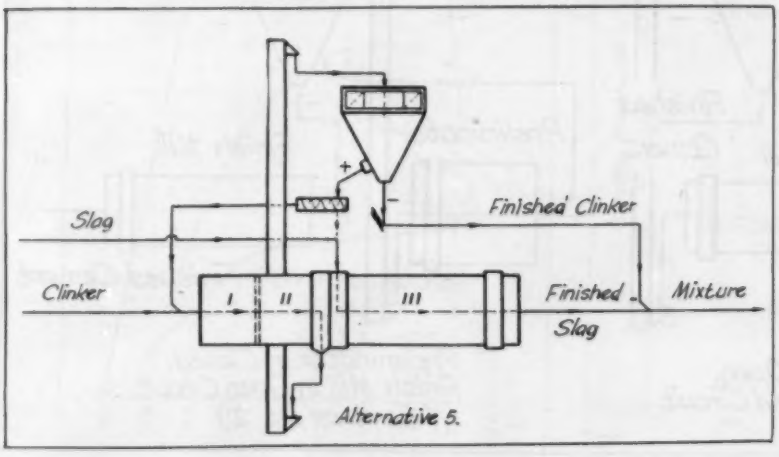


Fig. 2: Basic flow sheets for closed circuit grinding. Alt. 1 and 2: (above), third compartment in open circuit. Alt. 3 and 4: (above), third compartment in closed circuit. Alt. 5: (below), separate grinding of slag and clinker.



from the air-separator. This method has been tried only a few days and should be most advantageous for grinding hard materials. To obtain the best utilization of the first and second compartments, the material should be highly pre-ground.

In Alt. 2 all tailings are returned to the first compartment, and the fines are finish-ground in compartment 3. The air-separator is adjusted for coarse particle size, and the circulating load is kept low. This method is characterized by high air-separator efficiency and comes closest to the principle of the compartment mill; it may only be used for homogeneous materials.

Alternatives 3 and 4 in Fig. 2 are typical closed-circuit systems, which permit high circulating loads, and in which the air-separator fines are the finished cement.

Alt. 4 differs from Alt. 3 only by the adjustable division of the tailings between compartments 1 and 3. Feeding warm tailings to compartment 1 has been found useful, especially when the feed is moist. Both alternatives have a relatively low air-separator efficiency. The desired capacity of the circuit depends on the desired fineness-curve of the product, although the highest circulating load does not necessarily correspond to the most desirable particle size distribution; the fineness for which the separator is set and the speed of the material through the third compartment are opposing factors and determine an optimum condition. The circulating load is, as shown later, of importance to the strength of the cement; at the same time it is the best measure of the grindability of the slag components.

The installation may also be used for separate grinding of the clinker and slag, as shown in Alt. 5, Fig. 2. While the clinker is ground in closed circuit through the first and second compartments, the slag is fed directly to the third compartment. To prevent overloading the first compartment, the tailings are fed through a screw conveyor, the overflow from which goes to the third compartment, which is not fully utilized anyway in grinding the slag. This system has been tried only in isolated tests and not for industrial scale production; a leakage at the entrance to compartment 3 enabled some of the slag to enter the clinker circuit and made a determination of the clinker fineness uncertain. The tests will be resumed as soon as the partition with inlet scoops before compartment 3 has been made tight.

Separate grinding is based on the thought that by fine-grinding the clinker alone one may be able to increase the early strength of the slag-cement. It cannot be predicted, however, whether the "separation-characteristics" of the ground clinker (with prevention of overgrinding) is more advantageous than straight grinding characteristics.

According to Kühl[2], Gottlieb[3], Gründer[4] and others, it should be possible to economize on the clinker component, since the coarser particles, larger than 30 microns, participate only very slowly in the hardening process.

The combination of the two components in the cement pump following the mill provides sufficient mixing; it is evidently increased by an electrostatic effect of the freshly ground materials.

A comparison of these alternatives with typical grinding circuits in the U.S.A., as reported by Mussgnug[5], shows that the American grinding systems normally are equipped with two separators; the preliminator is a high-capacity ball mill and the secondary mill has either one or two compartments. These circuits are similar to Alt. 3 and 4 at Watenstedt.

It is interesting to note the trend in this direction, as developed by a large American machinery manufacturer, probably Allis Chalmers, and shown in Fig. 3.

The diagram to the right, showing after-grinding of the separator-fines, corresponds to the previously described Alternative 2, which may be suitable for homogeneous, hard-grinding materials, although not for slag-cement.

The left diagram illustrates compartment mill grinding followed by air separation and is therefore fundamentally different from previous grinding technique; the increase in output which would have resulted from separation after the preliminator so that the "flour" would have been prevented from entering the secondary mill, has been sacrificed.

The Americans attempt, in other words, to obtain the quality of open-ground cement, without at the same time losing the well-known higher efficiency of the closed circuit which may be had by the use of one or two air separators of a diameter of 16 ft. and more. They believe, on the other hand, that this method tends to produce a cement of a uniform grain size, requiring finer grinding than would be necessary by using straight open circuit to improve the volume stability without loss of strength. But it may not be assumed that the American cement industry some day will return to straight open circuit; the air-separation principle, correctly used, and adjusted to the material being ground, will remain as a part of American grinding technology.

The operational data, given in the

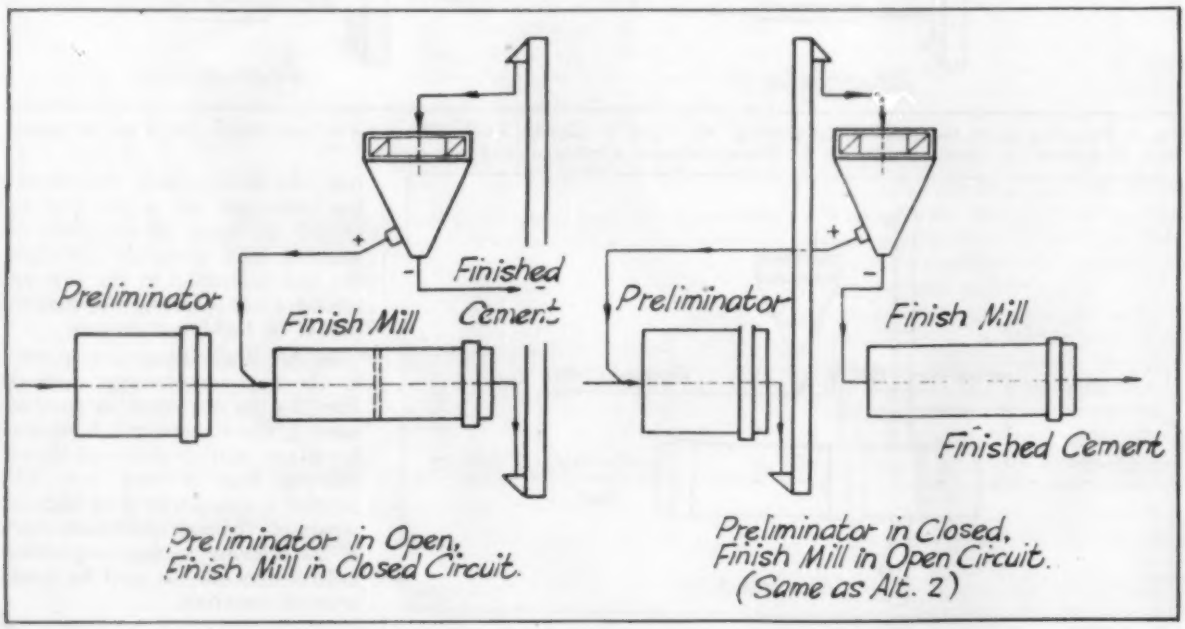


Fig. 3: Trend in American cement grinding methods.

TABLE 1
Analysis of Clinker Used in Slag Cement

Analysis	Clinker T		Clinker S	
	%	Loss-free		Loss-free
Insolubles	0.35		0.4	
SiO_2	20.28	20.4	20.56	20.9
Al_2O_3	7.16	7.2	7.0	7.1
Fe_2O_3	3.16	3.2	2.26	2.3
MnO	0.13			
CaO	64.54	65.0	63.5	64.6
MgO	1.98		3.55	
SO_3	0.69		0.39	
Ignition loss	0.94		1.81	
Sa	99.23		99.47	
K S	96.0		91.3	
Setting time	2^{15}-5^{40}		2^{15}-5^{40}	
Fineness + 0.09 mm.	5%		5%	
+ 0.06 mm.	11%		11%	
Strength	Flexural	Compressive	Flexural	Compressive
3 days	46.1	203	42.5	179
7 days	61.0	300	59.5	272
28 days	79.6	440	71.5	384
Strength Index W = 5 × Flex. + Comp.				
For 3 days	434		392	
For 3-7-28 days	1,877		1,702	

TABLE 2
Analysis of Blast Furnace Slag Used in Slag Cement

Analysis	Slag RW	Slag J
SiO_2	33 -34%	33 -35%
Al_2O_3	12 -14.5%	12.5-13.5%
FeO	0.3- 0.6%	0.4- 0.7%
MnO	1 - 1.8%	0.7- 1.5%
CaO	42 -43 %	42 -44 %
MgO	4 - 5 %	4.5- 5.5%
S	1 - 1.5%	0.5- 1.5%
CaS	2.5- 3.4%	1.3- 3.4%
Free lime	40.5-41.0%	41 -42 %
F. Modulus	1.70-1.75	1.65-1.80
Glass	90-95%	80-90%
Loose weight, wet, g/l	500-900	900-1,200

following tables and diagrams, show the technical superiority of the closed circuit (Alt. No. 3) for grinding slag cement.

Materials

Tables 1 and 2 show the most important data of the clinker (T and S) and slag (RW and J) which are being ground. Only clinker S was used during the tests; it did not quite have the quality of clinker T, but was easier to grind.

The two types of slag are different as indicated by the glass contents. This is also clear from Fig. 4, in which the hydraulic value HW has been calculated through grinding tests with various amounts of clinker S according to Keil's (6) formula:

$$HW = \frac{h-s}{k-s} \times 100\%$$

where:

h = Strength of mixtures of an n parts slag + (100-n) parts clinker

s = Strength of mixtures of n parts standard sand + (100-n) parts clinker (ground together)

k = Strength of clinker alone

In this formula the strengths are entered as "Strength Index", as proposed by Keil, and as will be explained later. The Hydraulic Value (HW) indicates, in other words, the percentage of slag in a given mixture which should be replaced by clinker to provide the same strength. In a mixture of 50 percent slag and 50 percent clinker, for example, the use of the slag RW increased the strength

Fig. 4: Hydraulic values of the slags according to 3 and 28 day strength indexes.

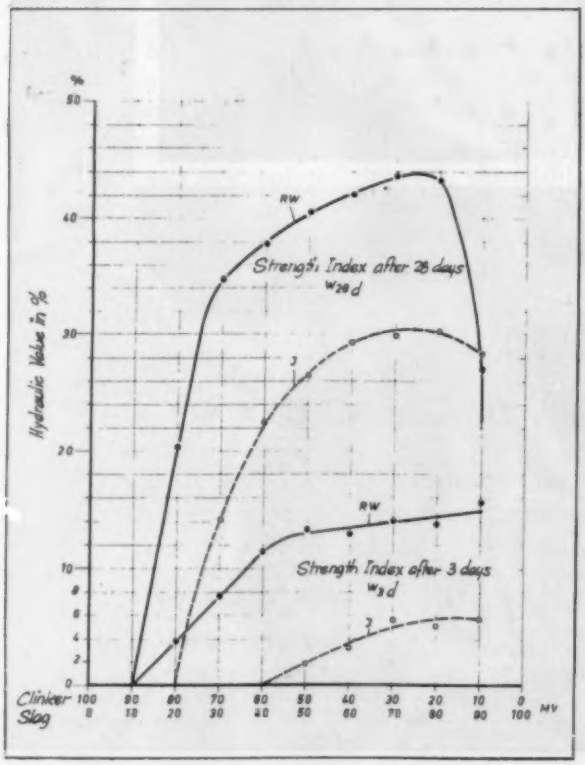
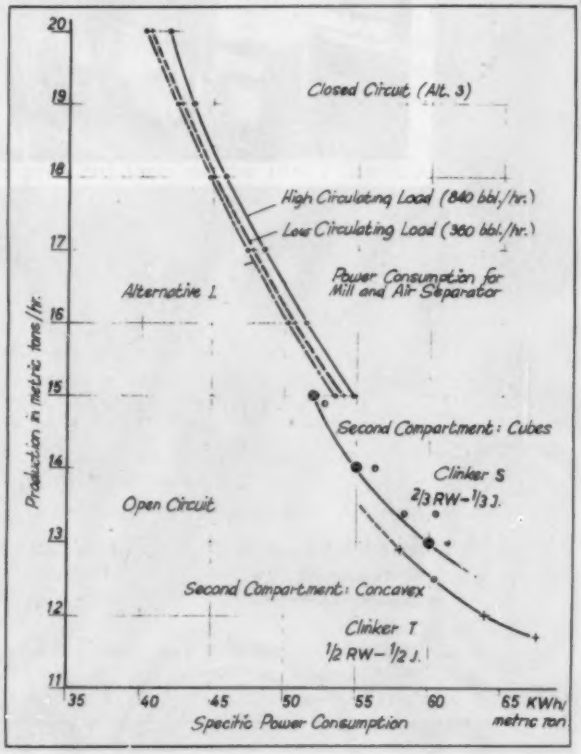


Fig. 5: Specific power consumption in kwh/metric ton for 7-ft. 9-in. by 43-ft. mill in open and closed circuit.



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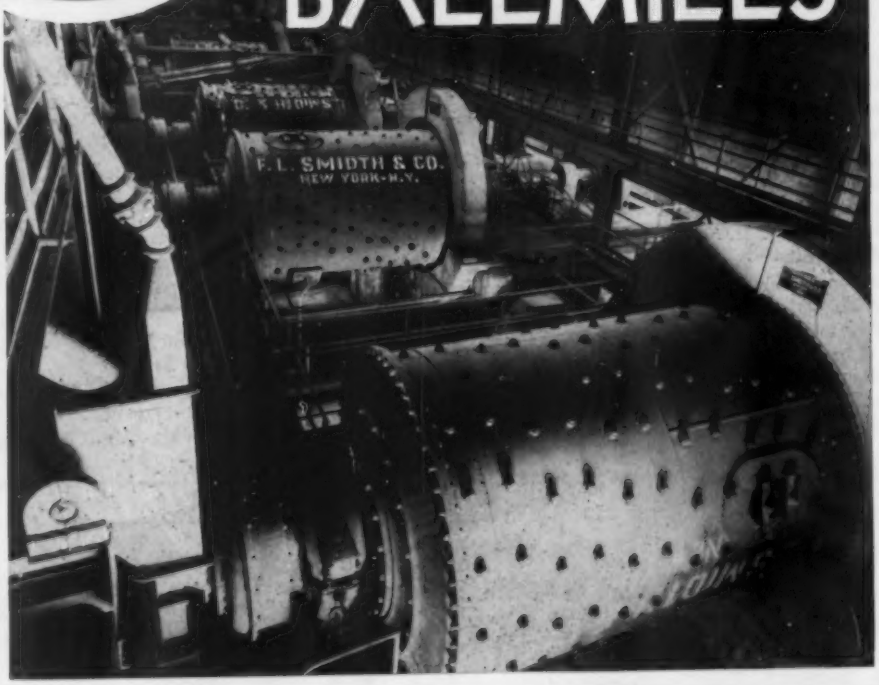

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TABLE 3
7′-9″ x 43′ Compartment Mill
Ball Load and Power Consumption

	1st Comp.	2nd Comp.	3rd Comp.	Total
Effective volume	17.8 m³	11.2 m³	24.1 m³	53.1 m³
Ball Load	20.5 t balls 50/80	*a*) 14 t Conc. 30 *b*) 14 t CU 20/25	28 t CU 16/22	62.5 t
Filling	26.2%	*a*) 26.1% *b*) 23.6%	20.2%	*a*) 24.2% *b*) 23.7%
Calculated power cons'n. at clutch	235 kw.	*a*) 161 kw. *b*) 166 kw.	338 kw.	*a*) 734 kw. *b*)739 kw.
Measured power cons'n.	20 t 184 kw.	*b*) 164 kw.	320 kw.	668 kw.
Idling: mill body	18 kw.	12 kw.	24 kw.	50 kw.
At clutch	202 kw.	176 kw.	344 kw.	718 kw.
Motor				39 kw.
Transmission				25 kw.
				782 kw.
Mechanical efficiency				0.92
Monthly average actual		*a*) Conc. *b*) Cubes		760 kw. 766 kw.

as would $\frac{50 \times 40}{100} = 20$ percent clinker, whereas the use of the slag J would increase the strength as would only $\frac{50 \times 26}{100} = 13$ percent clinker.

The relative value of such a comparison is not diminished by the fact that it cannot be directly applied to operational grinding where the end-fineness of both components is of decided importance.

The first grinding test with the compartment mill in open circuit was carried out with a mixture of 2/3 to ½ slag J and 1/3 to ½ slag RW, combined with clinker T. The comparative test in closed circuit, on the other hand, was made with 2/3 RW + 1/3 J, of a generally higher grindability.

The open circuit was thus tested in two different periods; one, with clinker T, low-grindability slag, and Concavex grinding media in the second compartment; the other with clinker S, slag of normal grindability, and cubical media.

Ball Load and Power Consumption

Table 3 gives the most important data for the open-circuit grinding. The mill was charged (24 per cent of the volume) with 136,500 lb. of grinding media. The second compartment was (a) first charged with Concavex; this was later (b) changed to cubes, whereby the production was increased between 8 and 14 bbl./hr. at the same sieve-residue. As shown later, the fineness expressed as sieve-residue, or even as specific surface, is no measure of the strength. The production increase was thus only apparent.

The comparison between calculated and measured power consumption should be noted; it was measured while first running the motor idle, then connecting the speed reducer and the empty mill one at a time, and finally successively filling the compartments. The difference between measured and monthly average power consumption is due to irregular replacement of grinding media (the average wear of grinding bodies was as yet unknown) and delays in ascertaining the actual power consumption through parallel readings with counters, load recorders, and Maxi-Graphs.

Table 4 gives the corresponding data for closed-circuit grinding. As for open-circuit, the monthly average power consumption is less than the calculated figure.

The air-separator increases the total power consumption of the grinding installation by 7 percent when arranged according to Alternative 3 (Fig. 1) and by 5 percent when arranged according to Alt. 1. Per barrel of cement produced, however, the power consumption is 1.7 kw.-h. lower than for the compartment mill when grinding materials of high grindability, and 0.9 kw.-h. with materials of low grindability.

The better ratio obtained in America is caused by dividing the installation into a separate preliminator followed by a fine-grinding secondary mill, so that each can be operated independently at the most advantageous diameter and speed. The load on the preliminator is furthermore lightened by widely used pre-crushing to ¼ in.

It is fundamental for this study that the end-fineness, particularly the specific surface, and the strength cannot be evaluated without considering the grinding action of the test mills. The following factors must also be considered: the clinker content of the end-product, the hydraulic value and grindability of the components, sieve-analysis and moisture content of the output, and finally the ball load. The specific weight of the moist granulated slag and the sieve analysis after passing the Hazamag drier are in proportion to the grindability. The moisture content of clinker and slag was below 3 percent, most often 1 percent and less.

(To be Continued)

TABLE 4
7′-9″ x 43′ Mill in Closed Circuit
Ball Load and Power Consumption

	1st Comp.	2nd Comp.	3rd Comp.	Total
Effective volume	18.7 m³	11.25 m³	21.7 m³	51.65 m³
Ball Load	20.5 t balls 50/100	*a*)13 t Conc. 30/50 *b*) 13.7 CP 25	28tCU16/25	61.5 t 62.2 t
Filling	24.9%	*a*) 25.2% *b*) 22.1%	24.3%	*a*) 24.7% *b*) 24.1%
Calculated power cons. at clutch	239 kw	*a*) 151 kw. *b*) 165 kw.	329 kw.	*a*) 719 kw. *b*) 733 kw.
Idling motor and transmission				64 kw.
				a) 783 kw. *b*) 797 kw.
Monthly average actual		*a*) Conc. *b*) Cylpebs		750 kw. 755 kw

The Alpha Portland Cement Company at Catskill, N. Y., will install a Hewitt-Robins conveyor belt system approximately one mile long, replacing an aerial tramway long in use. It will carry limestone at the rate of 300 t.p.h. from the screening station to the storage area where the limestone is crushed.

The Huron Portland Cement Company has opened a district sales office at 402 Colton Building, Toledo, Ohio, according to Blaine E. Miller, district sales manager. Sales were formerly handled at the firm's shipping plant at 840 Water Street, Toledo.

SEE WHERE YOU CAN'T LOOK With TV Control of Operations

FOR the last seven years industrial concerns, in rapidly increasing numbers, have been discovering that television can be used profitably to improve operations. Providing remote vision through the medium of a television camera and viewer, linked together by co-axial cable, industrial television has proved to be an effective means of reducing accidents, operating costs and/or capital investments.

Since industrial television, or ITV as it is commonly referred to, permits you to see where you can't look, it answers a very important need where the size of an operation precludes adequate visual coverage by one individual, or where one or more key points are obscured or inaccessible.

ITV is especially useful wherever centralized control is employed. Operators, well removed from processes they regulate, now may span the intervening distance visually through the "eyes" of television. Since "seeing is believing," it is easy to understand how the use of television can give operators greater confidence in their work. The result is fewer mistakes, higher output and, in many applications, fewer costly accidents.

Very often ITV permits single operator control of an industrial process which heretofore required the efforts of several widely scattered individuals. The consequent saving in operational cost and overall improvement in output can be readily seen.

ITV equipment is flexible in design to suit varying modes of operation. Any number of viewers may be employed to receive pictures from a single camera simultaneously. Any number of cameras may be switched to one or more viewers. Transmission distance can be extended beyond 1500 feet by means of booster amplification in the camera or viewer or both, permitting separations up to one mile normally without need for intermediate boosters.

Enclosures have been designed for applications where the TV camera is subjected to high temperatures, abnormal dust conditions, or where the camera must be located in explosive atmospheres. Some applications require remotely controlled traversing and tilting mounts although, in most instances the camera position remains fixed with the possible addition of the selection and focusing of several lenses controlled from the viewing position.

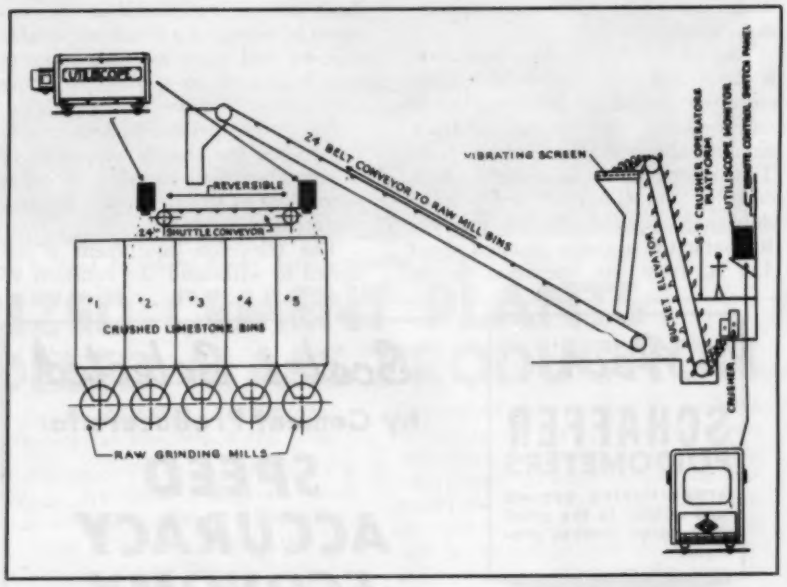

Fig. 1. Diagram showing how television permits one operator to load limestone in the storage bins by remote control.

An interesting example of how industrial television can be used to centralize operations, at the same time reducing operational cost, can be found at the Columbia Cement Division, Pittsburgh Plate Glass Co., East Fultonham, Ohio. Here a closed-circuit television system has been used successfully for many months in limestone-handling operations, representing probably the first application of this new industrial tool in the cement industry.

Fig. 2. Left: Bin level information is received on the television screen by the crusher operator, who operates the loading mechanism by remote control.

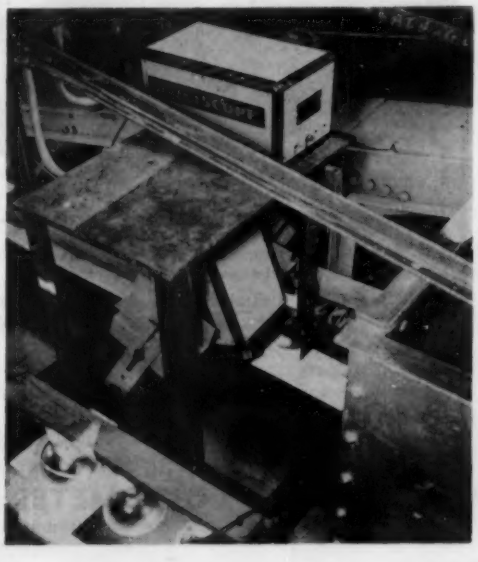

Fig. 3. Right: TV power units, lights, and camera are shown in position on a shuttle conveyor over limestone bins at the Columbia Cement Division's plant at Zanesville, Ohio.

Use of the television system permits an operator to control the flow of stone through the secondary crushing operation, up 450 ft. of conveyor belting to a shuttle conveyor and finally control the feed of the crushed stone into five 1,000-ton capacity storage bins.

Key to the bin feeding operation is the shuttle conveyor, a 50-ft. long conveyor geared to move backward and forward over 100 ft. of track situated above the five storage bins. Television cameras mounted on both ends of the conveyor are pointed downward toward the bin interiors to enable the operator situated about 450 ft. from the operation to see the amount of flow of product against specially designed bin fill indicators. (Figure 1.)

By means of a switch, the picture from either camera is alternately available on the monitor (Figure 2). Each camera is mounted on the conveyor by means of a simple adjustable support and each associated power unit is located on a platform above the camera (Figure 3).

Before the operator by remote control moves the shuttle conveyor, he sounds a warning whistle as a safety precaution to anyone passing through the area.

The television equipment is designed to withstand the constant vibrations and dust conditions prevalent in this area of operation. Special design of equipment utilized in handling the coaxial cable on the moving equipment was effectively worked out by the Columbia Cement Division's engineering department under William Sutton, chief engineer.

Principal problem encountered when the operation got under way was perception of depth during the period of stone flow into the storage bins. Gray stone pouring into a bin covered with gray dust permitted a minimum contrast on the picture on the monitor. A system of cross bars installed 5 ft. from the bottom of the bins and again at the top rim solved this problem. One cross bar on Number One bin indicates to the operator not only the volume of fill but the exact bin being serviced. Thus, bins one to five are so indicated to the crusher operator. The bin-filling operation works on a three-hour cycle. Prior to the television installation, an employee was assigned full time to move the tripper manually on the conveyor.

To evaluate more fully the feasibility of television for a given application it is essential to know the capabilities and limitations of the several types of camera tubes currently available for ITV equipment. Since the camera tube is the heart of any television system, its capabilities and limitations become, in a general sense, those of the system itself.

The Image Dissector camera tube, which has become known as the "work horse of industrial television," was the first tube to be used for this purpose. Since it contains no filament or electron gun or, in other words, works on the "cold cathode" principal, it therefore enjoys an extremely long life and is guaranteed for 8,750 hours of operation. However, Image Dissectors installed as far back as 1947 are still in continuous operation today even after 54,000 hours of service.

From the foregoing it becomes apparent that the type of service, severity of operating conditions, available illumination, and definition requirements are the main factors lending to choice of one type of system or another.

Since the television camera must often be located at a point where dust, dirt, heat, and vibration, either separately or in combination, are abnormally severe, protective devices usually become an important part of the installation. Many types have been designed to provide adequate protection under the wide range of

(Continued on page 120.)

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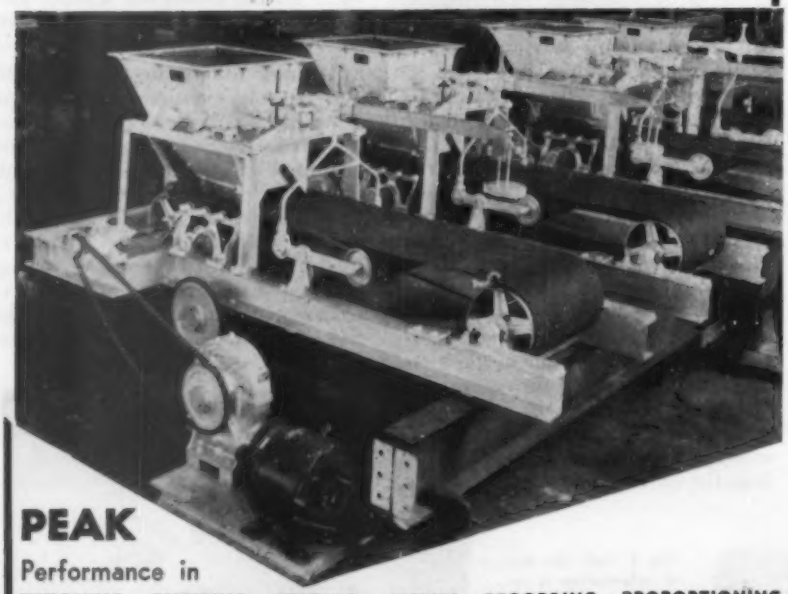

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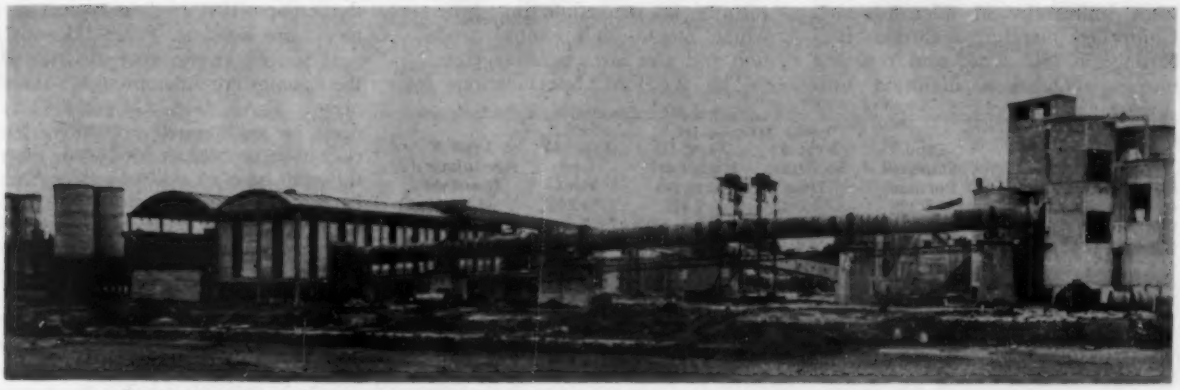


Dry-Process plant of Ste. des Ciments Portland de Bizerte, Bizerte, Tunis, producing 400 metric tons per day.

STANDARDIZED CEMENT PLANTS USING CONTROLLED MASS PRODUCTION

By ALAN R. ALLEN
Kennedy Van Saun Mfg. & Eng. Corp.

A modern trend in the cement industry is toward standardized cement plants in which the three principal types of plants—wet, dry, and waste-heat dry—can be produced on one set of engineering plans.

An outstanding advantage of the standardized design for the three principal types of plants has been the reduction in the engineering costs for any one plant to approximately one-third that of any one of the three plants designed individually.

In the standardization of modern cement plant machinery, much of the same equipment can be used interchangeably in the wet and dry process cement plants, with only slight modifications to meet the particular process requirements.

In recent-day plants equipment for handling materials throughout the plant has been developed to an equally high stage for both wet and dry process so that no longer is the choice of a wet or dry plant determined by which type of cement process makes better cement. Machinery is equally available in either the wet or dry process and the choice of a wet or dry process depends more upon weather conditions at the plant, the type of raw materials, the impurities in the raw materials and the cost of fuel as well as the availability of power.

Tables I and II illustrate some of the factors affecting choice of processes. Factors such as the colloidal nature of the raw materials have a very important bearing on the process. In dry plants with heat exchangers the waste heat is used to dry raw materials directly in the raw grinding mills without using preliminary dryers, and extra fuel consumption.

Control can be concentrated at one point in the plant. From this point the materials for making cement can be composed by mass production methods into any of the recognized types of cement by the schedule of requirements.

It is unnecessary to try various combinations of raw materials in hopes of finding a combination that will produce an acceptable cement. Controlled mass production methods will make the correct type of cement with the correct composition for that type, from a wide variety of raw materials. Any raw materials that are not suited for cement making will be rejected at once without waiting to find its effect on the cement. Such methods work equally well in a wet or dry plant. Cement is now being produced in both types of plants with constant conditions and of equal uniformity and quality.

In wet plants it is customary for the thickener to hold 4 to 5 days production of material from the raw mills that must be kept constant, and this introduces time delays in changing from one combination of raw materials to another. To get around this delay, in wet plants, it is necessary to install a second thickener or to use a separate mill in open circuit. The separate thickener requires large space and must be kept agitated when not in use. The open-circuit mill is still more objectionable because of its variation in particle size.

In the dry plant these problems do not arise. There is no large mass of material in the classifying circuit. The mill can be stopped and started at will, and any change in the setting of the mill will be reflected in the final product.

In modern operations control begins at the quarry and is extended through the rock crushing plant and bedding storage, where physical and chemical uniformity are attained with closed circuit crushing. In the crane storage, reserves are kept to maintain uniformity in handling conditions.

Constant moisture conditions maintain uniformity in mill feeding, and closed-circuit grinding main-

Table I
Heat Input Affected By Raw Materials

	Decomposition B.t.u./Lb. Clinker	Exothermic Heat B.t.u./Lb. Clinker	Net Heat Input B.t.u./Lb. Clinker
With high-calcium carbonate in raw material	975	180	795
With high-calcium silicate in raw material	695	130	565

Table II
Heat Losses Affecting Fuel Consumption

	Wet Process With Heat Exchanger With 36% Water In Slurry B.t.u./Lb. Clinker	Dry Process With Heat Exchanger B.t.u./Lb. Clinker
Moisture loss in raw materials	1070	30
Hydrogen and coal moisture loss	160	120
Exit gas loss	285	365
	1515	515

tains uniformity in micron sizing. Controlled blending maintains uniformity in kiln feed, and constant burning conditions maintain uniformity in the clinkering zone — which means high annual production and also low operating cost.

The A.S.T.M. Specifications for the composition of five typical cements are listed in Table III.

Table III

Compounds	Type I Standard Portland	Type II Moderate Heat	Type III High Early Strength	Type IV Low Heat	Type V Sulphate Resistant
C_4AF	8.2%	10.6%	7.9%	11.2%	10.0%
C_3A	11.8	6.8	11.5	3.5	3.7
C_3S	45.4	49.6	64.4	31.4	35.0
C_2S	26.0	25.4	8.2	46.9	44.2
$CaSO_4$	3.1	3.1	4.1	3.0	2.9
MgO	3.5	3.7	2.6	3.1	3.4
Loss	2.0	0.8	1.3	0.9	0.8
	100.0	100.0	100.0	100.0	100.0

Table IV
Raw Materials

	Sand	Clay	Iron Ore	Limestone	Coal Ash
SiO_2	83.29%	54.20%	40.80%	8.00%	53.60%
Al_2O_3	5.21	21.32	8.15	3.11	19.80
Fe_2O_3	3.47	8.38	50.10	.89	7.50
CaO	.01	1.47	.10	48.02	8.80
SO_3	....	....	....	....	....
MgO	.01	1.59	....	1.01	5.40
U.D.	3.10	1.29	.85	.27	4.90
Loss	4.91	11.75	....	38.70	....
	100.00	100.00	100.00	100.00	109.99
				100.00	100.00

Table V
Cement Incl. 4.16% Coal Ash and 3% $CaSO_4$

Raw Mix		Compounds	
SiO_2	13.5%	21.7%	C_4AF 8.2%
Al_2O_3	3.7	6.2	C_3A 11.9
Fe_2O_3	1.6	2.7	C_3S 45.4
CaO	43.9	64.1	C_2S 27.9
SO_3	..	1.8	Free Lime .1
MgO	1.0	1.6	MgO 1.6
U.D.	.4	.9	$CaSO_4$ 3.0
Loss	35.9	1.0	U.D. .9
	100.0	100.0	Loss 1.0
			100.0

Table VI
Cement Incl. 4.16% Coal Ash and 4% $CaSO_4$

	Raw Mix		Compounds	
SiO_2	12.3%	19.8%	C_4AF	7.8%**
Al_2O_3	3.6	6.0	C_3A	11.5
Fe_2O_3	1.6	2.6	C_3S	64.4
CaO	44.7	65.3	C_2S	8.2
SO_3	..	2.3	Free Lime	.1
MgO	1.0	1.8	$CaSO_4$	4.0
U.D.	.4	.9	MgO	1.8
Loss	36.4	1.3	U.D.	.9
	100.0	100.0	Loss	1.3
				100.0

View of the 9- by 11- by 350-ft. kiln at the 250-metric-ton-per-day wet-process cement plant of Cia. dos Cementos do Angola, Lobito, Angola, West Africa.

It is well known that all four of the important compounds listed above (C_4AF, C_3A, C_3S, and C_2S) must be maintained accurately for each type of cement produced. Four different types of raw materials, each in proper proportion, must be used to produce the correct amount of each compound in each cement. This method is popularly known as the four-component mix.

Attempts have been made to operate a cement plant on a two-component mix or a three-component mix, but it is possible to control only the number of compounds equal to the number of different materials in the raw mix. A two-component mix will control only two of the four cement compounds. A three-component mix will control three of the compounds. It is only with a four-component mix that all four compounds can be controlled.

In a plant designed for a four-component mix it is not usually possible to set all four feeders of raw materials ahead of the raw mills with sufficient accuracy to maintain uniform raw feed to the kiln without supplementary corrections. Neither is it possible at all times to correct accurately the raw feed by the usual high- and low-lime system to obtain an average, since this method will correct only one of the four compounds. To make good cement all four of the components must be maintained accurately.

To illustrate the advantages of controlled mass production method listed below are tables of typical raw materials. The kiln is coal-fired with coal having an unusually high ash content, in which the final clinker contains approximately 4.16 percent of coal ash.

The raw materials (Table IV) when mixed in the following proportions, will make ordinary standard portland cement, A.S.T.M. Type I (Table V):

Sand	5.4%
Clay	2.5
Iron ore	.9
Limestone	91.2
	100.0

These same raw materials, however, when mixed in slightly different proportions will make high-early-strength cement, A.S.T.M. Type III (Table VI):

Sand	4.1%
Clay	2.0
Iron ore	.9
Limestone	93.0
	100.0

The above analyses are the proportions required in the final cement. However, if it is attempted to feed the above proportions of raw materials directly to the mill to produce the required cements, difficulties arise. This has been tried and in some cases reasonable results have been obtained. Much depends upon the human element and variations in the raw materials, to hold all four raw materials sufficiently accurate to obtain the correct compounds in the cement for any extended period.

This process eliminates the human element in the proportioning of the feeders for the mills. The feeders are set to produce approximate mixtures that come within predetermined limits, and the only requirement is that the calcium feeder shall deliberately be set high for the final raw mix and all other feeders shall be set low. The exact amounts of the settings are not important if they remain within the predetermined limits.

Mass Production Setting for Material Fed to Mill

	Standard Portland Cement	High Early Strength Cement
Sand	5.0%	3.7%
Clay	2.1	1.7
Iron Ore	.6	.6
Limestone	92.3	94.0
	100.0	100.0

Raw Material Discharged From Mill

	Standard Portland Cement	High Early Strength Cement
SiO_2	12.9%	11.8%
Al_2O_3	3.6	3.5
Fe_2O_3	1.5	1.4
CaO	44.4	45.2
MgO	1.0	1.0
SO_3	..	..
U.D.	.4	.4
Loss	36.2	36.7
	100.0	100.0

Raw materials from the mill are deliberately proportioned sufficiently far from the final required proportion to permit final blending into the exact requirement. Material for correction in the blending process is arranged as follows:

Correction Tank #1—High silica
Correction Tank #2—High alumina
Correction Tank #3—High iron

	Correction Tank No. 1 High Silica	Correction Tank No. 2 High Alumina	Correction Tank No. 3 High Iron
SiO_2	21.69%	17.80%	16.16%
Al_2O_3	3.68	5.86	4.12
Fe_2O_3	1.61	2.32	7.46
CaO	39.01	39.16	39.08
SO_3	....	....	....
MgO	.84	1.05	.85
U.D.	.77	.53	.48
Loss	32.40	33.28	31.85
	100.00	100.00	100.00

Analysis of raw material coming from the mill, the amount of material to be added from each of the correction silos is determined, as follows:

	Standard Portland Cement	High-Early-Strength Cement
Raw material from mill	90.66%	92.72%
High silica	3.43	2.63
High alumina	3.30	2.05
High iron	2.61	2.60
	100.00	100.00

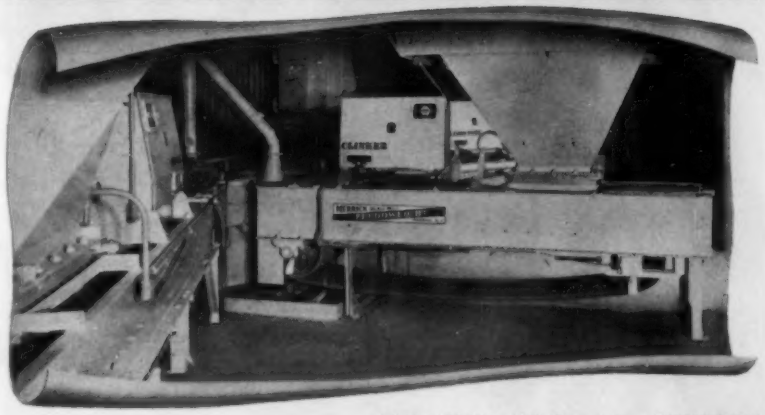
For a silo holding 600 tons of raw material, the amounts of material from each silo are as follows:

	Standard Portland Cement	High Early Strength Cement
Raw material from mill	543.9 tons	556.3 tons
High silica	20.6	15.8
High alumina	19.8	12.3
High iron	15.7	15.6
	600.0	600.0

When the above materials are blended into final kiln feed the following cement is obtained (including 4.16% coal ash and the necessary $CaSO_4$):

. . . when Cement Plants E-X-P-A-N-D

4 out of 5 SPECIFY MERRICK IN THEIR PLANS



A typical Multiple Unit Cement Plant FEEDOWEIGHT installation feeding Clinker, Gypsum and Limestone to process via a common discharge chute.

Cement plants throughout the land continue to specify Merrick FEEDOWEIGHTS* when building new mills or expanding present facilities — AND RIGHTLY SO — because the Feedoweight proves itself again and again to be THE accurate dependable WEIGHT FEEDER upon which you can rely for uniformity of feed and product.

It is interesting to note that MERRICK PRODUCTS are employed at the 3 producer plants described in this Cement Mill Issue.

Likewise the Merrick WEIGHTOMETER* enjoys equal acceptance when weighing Raw Materials, Coal to Power Plant and Finished Product to Storage — on Belt Conveyors.

See Bulletins 375 and 253 for full details

*Reg. U.S. Pat. Office

MERRICK SCALE MFG. CO.
180 AUTUMN STREET • PASSAIC, NEW JERSEY

	Standard Portland Cement	High-Early-Strength Cement
SiO_2	21.7%	19.8%
Al_2O_3	6.2	6.0
Fe_2O_3	2.7	2.6
CaO	64.1	65.3
SO_3	1.8	2.3
MgO	1.6	1.8
U.D.	.9	.9
Loss	1.0	1.3
	100.0	100.0

In the above illustrations only two of the standard cements have been used. It very often happens that the raw materials at the plant are suitable for one or two cements but are not suitable for the entire range of cements. In such cases additional raw materials must be located.

Sometimes raw materials for one type of cement may have to be ground differently than the raw materials for another type. In such cases the correction materials must be ground to suit the more critical type of cement that is being produced. In those cases where the range of grinding requirements for different types of cement produced in the plant differ too widely, separate sets of correction tanks must be used.

Improvement in the burning process, brought about by better control and better blending, shows a decrease in the cost maintenance and an increase in the annual production, with a consequent lowering of the unit cost per ton.

Kiln operation, ordinary — 335 days per year

Kiln operation, average — 345 days per year

Kiln operation, very good — 355 days per year

Perhaps the outstanding improvement in the burning operation in the kiln has been that of burning closer to the discharge end of the kiln.

With the older cement processes it had been necessary to direct the flame well up the kiln and to burn the clinker as far from the discharge end of the kiln as possible. This condition was brought about by variations in the raw feed which made it necessary for the burner operator to provide a sufficient time factor of safety to correct any irregularities that may occur from the time the clinker passes the hot spot of the flame until it reaches the discharge end of the kiln.

With this older type of burning the flame was drawn out over the kiln with the result that a large mass of clinker was heated to the point of incipient fusion where the formation of the silicates began to take place. In the usual cement materials 180 Btu's per pound of clinker are given off by the exothermic reactions in the formation of cement.

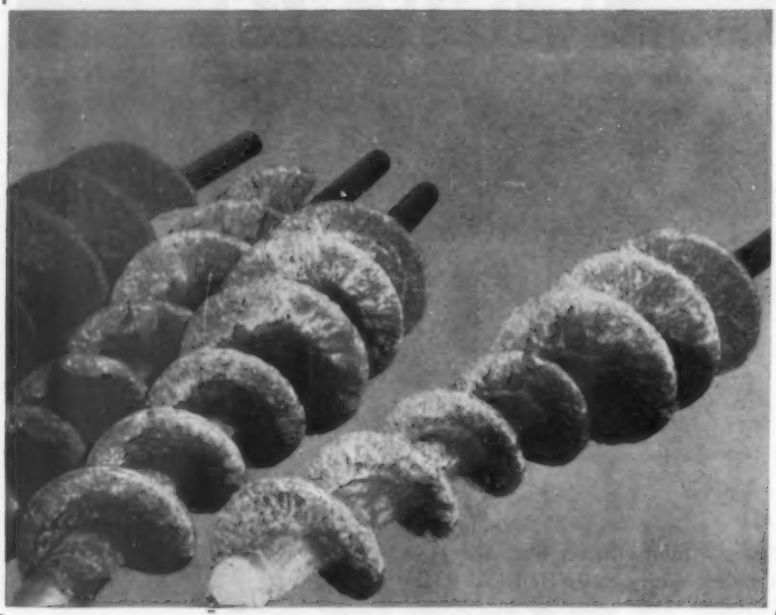
In a kiln of 2,500-bbl.-per-day capacity a large amount of clinker may be heated to the point where fusion is just about to begin; and when one part starts, the heat given off sets off a chain reaction that may touch off the whole mass in a matter of minutes, as for example:

Mass of material in clinkering zone	13 tons
Exothermic heat at 180 B.t.u./lb.	4,700,000 B.t.u.
Equivalent in coal	360 lb.
Equivalent heat release for 3 min. chain reaction	7,200 lb./hr. of coal
Normal firing rate, coal	7,000 lb./hr.
Chain reaction, heat release	100%

Most burner operators have witnessed this disastrous reaction, since the sudden increase of heat usually burns out the refractory.

In controlled mass production methods the burning hazard is practically eliminated by the type of grinding and blending control that permits burning close to the end of the kiln. In the present-day kilns, clinker rings have been practically eliminated.

SAVE TIME, EFFORT and MONEY WITH REXARC



If you have abrasion and impact problems why not specify Rexarc Hardfacing Electrodes.

Rexarc 65 does an outstanding job in resisting abrasive wear on conveyor screws.

You can extend the life of hammermill hammers by using Rexarc S-3 as your build-up metal and then hardfacing with Rexarc 55.

Rexarc 65, Rexarc 55 and Rexarc S-3 are only a few of the fine Rexarc Alloys. There is a Rexarc Alloy for every Hardfacing need.

Please write for information or better — ask for a demonstration by your Rexarc Field Engineer. You will find that he is an expert with hardfacing problems.

THE SIGHT FEED GENERATOR CO.

63 East Third Street — West Alexandria, Ohio

MgO Analysis Time Cut By Use of Flame Photometer

THE magnesium oxide content, as well as the sodium and potassium oxide content, of portland cement must be kept at the minimum in order to obtain concrete of maximum strength. The standard chemical method of analysis to determine these elements is a long and tedious procedure. It has been a major problem with testing laboratories as well as those operated by cement manufacturers.

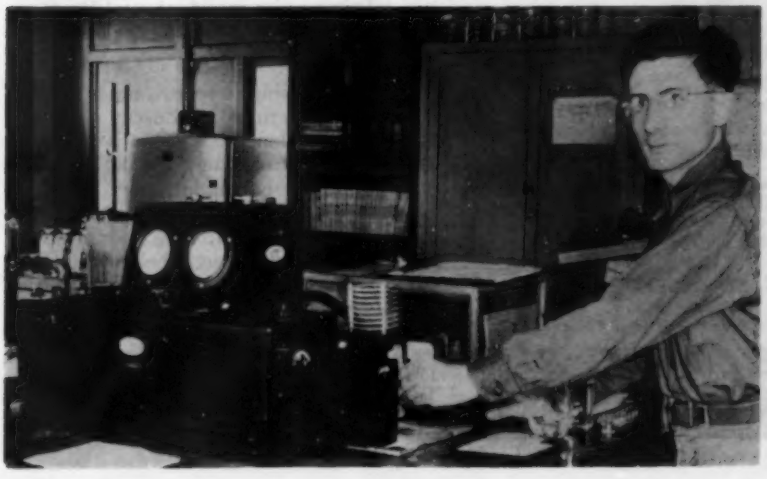
A portion of this problem was solved when the American Society for Testing Materials adopted a method for determining sodium and potassium oxides by flame photometry. However, magnesium oxide analysis by the standard gravimetric method still requires a large amount of time. Analysis by any of the three alternate methods offers little improvements since: (1) the rapid gravimetric method requires prior removal of SiO_2, Al_2O_3, Fe_2O_3 and CaO in addition to requiring the precipitated magnesium compound to stand for eight hours; (2) the alkalimetric method requires two filtration and two dilution steps after the boiling procedure; (3) the magnesium oxyquinolate method requires the double precipitation of $Al(OH)_3$ and $Fe(OH)_3$. In order to keep pace with the volume of samples coming into the laboratory, more personnel is required to do these analyses.

Cement manufacturers have problems of greater importance. Not only must customer specifications be met, but magnesium oxide concentration plays an important role in the economics of manufacturing. Most of the raw materials available locally (Los Angeles, Calif.) are contaminated with magnesium oxide, and in order to keep the concentration down to 5.0 percent, some ingredients are imported at great cost.

The procedure developed by the Los Angeles Bureau of Standards to determine magnesium oxide using the Beckman Model DU Spectrophotometer lowers the analysis time for 12 samples from 40 hours to 3 hours. The sample solutions are prepared in accordance with the accepted A.S.T.M. method for Type I analysis (which is to determine sodium, potassium, and magnesium oxides, as well as SiO_2, insoluble matter, and the determination of the loss on ignition) and analyzed by flame photometry. Several standard samples of cement of known magnesium oxide content and concentration previously analyzed gravimetrically are picked to obtain varying concentrations of magnesium oxide of 0 to 5 percent. These standard samples are prepared in the same manner as the unknown samples and are used to plot a calibration curve of luminosity *versus* MgO concentration. The intensity of the light emitted at 383 millimicrons is measured at a slit opening of 0.3 mm. A distilled water rinse is used after each unknown or standard to insure the cleanliness of the burner before each determination. Reproducibility is better than ± 0.2 percent MgO. This delicate analysis is possible solely because of the high sensitivity of the photometer.

Several years ago the National Bureau of Standards made a comparative investigation of the reproducibility of the A.S.T.M. method of analysis for portland cement by distributing a portion of a given sample of cement for analysis to various analytical laboratories throughout the nation. The average figure for magnesium oxide corrected for Mn_2O_3 was 1.65 percent; high value was 2.8 percent and low value was 0.82 percent. These figures show the gross variations possible by conventional chemical techniques, and point out the need for a simpler and more accurate method.

The flame photometer makes possible the routine flame determination of sodium, potassium, and magnesium, as well as SO_3 content turbidimetrically, in a given sample of cement in a few minutes after the sample solution is prepared by the A.S.T.M. method. Although the Los Angeles Bureau of Standards is not at present using the DU Spectrophotometer for sodium and potassium oxides, it has done so in the past and has found it to be entirely satisfactory for these analyses.



● Laboratory scene showing flame photometer in use.

Ireland's Cement Output Raised by Plant Expansion

Cement production in Ireland in 1952 totaled 1,698,216 long tons, valued at approximately $6,137,880, compared with 419,355 tons, valued at approximately $1,174,194, in 1951. Ireland's only producer, Cement, Ltd., with a mill and quarries near Drogheda, in County Lough, scheduled the completion of an expansion program for May of this year. Enlargement of the facilities will bring total capacity to about 1,600 tons per day, or an annual output of approximately 500,000 tons.

The increased production at Drogheda, plus the output of a branch mill at Limerick, will bring the total capacity of Cement, Ltd., to approximately 650,000 tons annually.

Air Reduction Safety Film Wins National Recognition

The National Committee on Films for Safety has presented Air Reduction Sales Company, of New York, with an Award of Merit in the occupational sound slidefilm class for Airco's new welding safety film *The Guy Behind Your Back.*

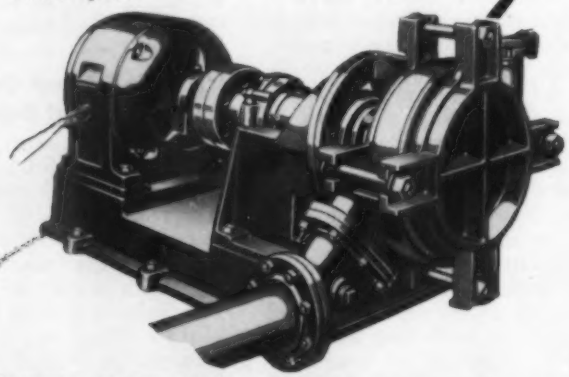
The 20-minute, sound-slide film deals with safety in the use of oxyacetylene cutting and welding equipment. Specifically designed for companies wishing to train their own employees, the story is presented in an amusing way with many cartoons and an easy-going narrative. Additional information on this film may be obtained by writing to Air Reduction Sales Company, 60 East 42nd Street, New York 17, New York.

10 REASONS WHY

Morris TYPE "R" SLURRY PUMP

is Ideal for Cement Mills

1. **LOW PRESSURE STUFFING BOX** — Subject to suction pressure only. Maximum packing life. No high pressures to force an excessive amount of solids into stuffing box.
2. **LOW SEALING WATER PRESSURES** — Negligible dilution of slurry when pumps are properly maintained.
3. **KEEPS FLOORS AND PITS CLEAN** — No spilling of slurry past the shaft.
4. **MAXIMUM LIFE OF WEARING PARTS** — Because the alloy is selected to suit the job — because Morris' pumps are applied to give low velocities through impeller and casing — because Morris pumps operate at low speeds.



5. **HEAVY SHAFT AND BEARINGS** — Eliminate dangerous vibration due to any abnormal operating conditions — long and satisfactory bearing life.
6. **EASY TO REPAIR** — Only four bolts need be loosened to renew impeller and shaft sleeve — not necessary to disturb piping.
7. **SAVES POWER** — In many instances able to move more material per KW.
8. **NO SEPARATE OR INTERMEDIATE SUCTION TANK REQUIRED**
9. **FLEXIBLE PERFORMANCE** — Operates satisfactorily under high positive heads or, if necessary, under a vacuum through moderately long suction lines.
10. **SAVES PIPING EXPENSE AND FLOOR SPACE** — Because the Morris Type "R" allows 72 different combinations of suction and discharge nozzle positions.

For long term efficiency — and economy . . . for simplified assembly and disassembly — and a minimum of shutdowns . . . specify Morris Type "R" Pump. Free consultation with a Morris engineer at your request.

Write for Bulletin #181

MORRIS MACHINE WORKS
Baldwinsville, N. Y.
Sales Offices in Principal Cities

MORRIS *Centrifugal Pumps*

Brazil's White Cement Plant

(From page 96.)

Power Source Electric power is purchased from the utility company and brought into the plant at 3 phase, 50 cycle, 25,000 volts. A 1,000-kv.-a. General Electric transformer steps down the voltage to 480, which is fed to an Allis-Chalmers unit substation for distribution to plant departments.

All Allis-Chalmers motors are designed to operate on the plant electrical system, which is 3 phase, 50 cycle, 440 volts. All motor starters of 7½ hp. and larger are of the reduced-voltage type, while motors of less than 7½ hp. are started across-the-line.

A 75-kw. motor-generator set furnishes 230-volt d.c. power to the kiln drive motor and excitation for the synchronous motors and synchronous tie generator. A separate distribution panel is provided to distribute the d.-c. power to its point of use.

Machine Shop A fully equipped machine shop installed in a separate building, has all the necessary machines and tools for routine maintenance and repairs.

Plant Construction Plant layout drawings were made in the engineering department of the Allis-Chalmers Mfg. Co. in Milwaukee, Wis. From the plant layouts Cimento Portland Branco Do Brasil prepared the detailed building and equipment foundation drawings. The construction work was done by Comparhia Construtora Cupua & Capure, S.A. All buildings, silos, and foundations are of reinforced concrete. Equipment was installed under the supervision of an Allis-Chalmers superintendent of installation.

Officials of the new plant include Dr. Julio Capua, president; Americo Capua, vice-president; San Tiago Dantas, vice-president; and Dr. Conrado Barsotti, industrial director.

According to reports made by producers to the U. S. Bureau of Mines, 437,499 long tons of native sulphur and approximately 28,000 long tons of recovered sulphur were produced in December, 1953. Output during 1953 totaled 5,155,342 tons of native sulphur, 3 percent below the 1952 record but the 337,000 long tons of recovered sul;phur produced was 36 percent greater than the total of the previous year. Sales were approximately equal to production; consequently producers' stocks at the end of the year were only slightly lower than at the beginning.

NEW

AGITAIR Direct-Fired Hot Gas Generating FURNACES

Capacities from 600,000 to 100,000,000 BTU's

AGITAIR Direct-Fired Furnaces are highly efficient heat producing units successfully used with RAW ROCK and CLAY GRINDING SYSTEMS for drying raw rock for cement mills, pulverized limestone, kaolin, and many other products requiring heating or process drying.

These furnaces are built of heavy steel fabrication with combustion chambers designed for high BTU releases. Constructed with high grade heat resisting materials. Design and construction incorporates latest development in the field of combustion.

COMPACT—little floor space or head room required.

OIL or GAS FIRED with combination for oil or gas firing.

MINIMUM COMBUSTION SPACE—reduces refractory lining—less maintenance cost.

PACKAGE UNIT with panel for automatic controls furnished fully wired. Light-weight insulating type refractories, when required, are factory installed.

INSTALLATION requires only a minimum of field labor—connections of fuel lines and electric circuit wires only requirement.

INSTALLATION COST—AGITAIR Direct-Fired Furnaces are easy to erect—the cost is a very small fraction of that for indirect fired furnaces—no expensive chimneys.

EFFICIENCY 90 to 95%—There are no stack losses from AGITAIR Direct-Fired Furnaces. Virtually all of the heat generated is utilized—air cooled combustion chamber shell reduces radiation losses to a minimum. High efficiency means less fuel required for a given heat output. Low BTU cost.

SPACE REQUIREMENTS—Available in vertical units where floor space is limited... horizontal where head room is a problem.

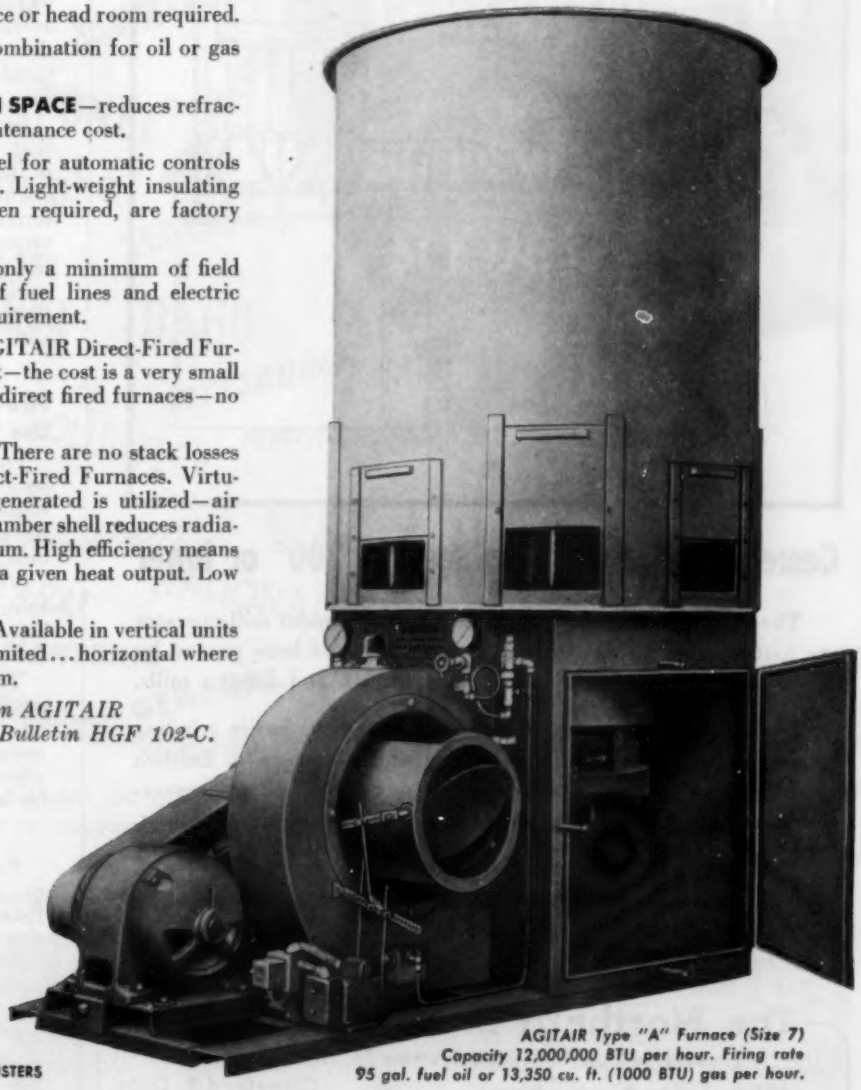
For further information on AGITAIR Furnaces write for Bulletin HGF 102-C.

AGITAIR Furnaces are made in two distinct types, "A" and "AP," in vertical or horizontal units, in a variety of sizes.

Type "A" illustrated below is designed for "*pull-through*" induced draft systems with furnace operating under *negative pressure.*

Type "AP" is for "*push-through*" forced draft systems with furnace operating under *positive pressure.*

These direct-fired furnaces attain BTU releases as high as 500,000 per cu. ft. of furnace volume.



AGITAIR Type "A" Furnace (Size 7)
Capacity 12,000,000 BTU per hour. Firing rate 95 gal. fuel oil or 13,350 cu. ft. (1000 BTU) gas per hour.

AIR DEVICES INC.

185 Madison Ave.
New York 16, N. Y.

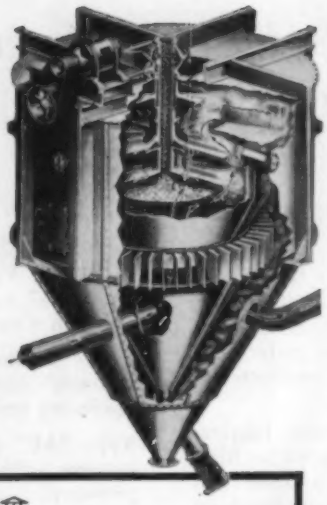
AIR DIFFUSERS • FILTERS • EXHAUSTERS

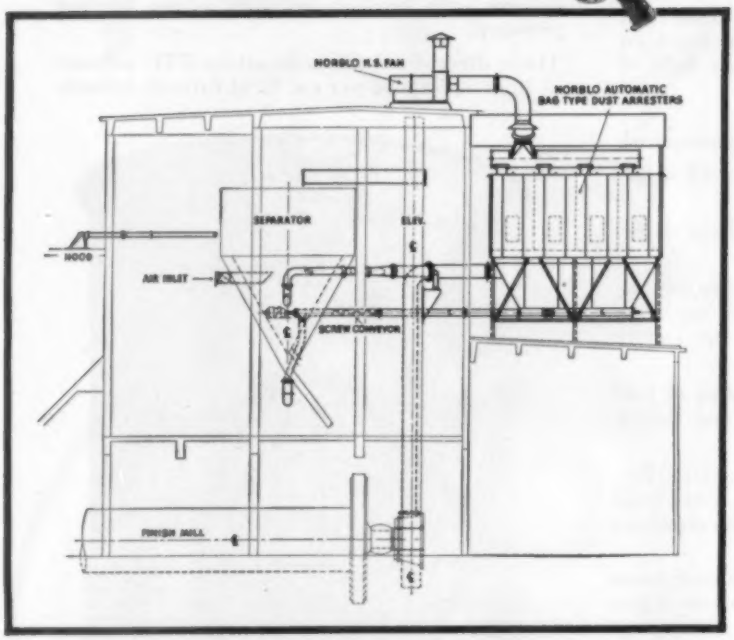
Norblo

Cement AIR Cooler

and Dust Collection System

Increases finish mill efficiency
Improves operating conditions





Cement temperature reduced to 200° or lower

The main facts of importance to you as a cement mill operator are found in the display headings above. They've been proved by actual performance in hundreds of American and foreign mills.

Norblo positive temperature control during the entire grinding process eliminates higher temperatures which damage the finished product. Cooling also increases the efficiency of the mill and separation system, and promotes safety of workmen, equipment and product.

How the Norblo Patented Cement Air Cooler as combined with Norblo Automatic Bag Type Dust Collector cleans up the entire milling process is fully described in our Bulletin 165-1. Write for it today.

The Northern Blower Company
Engineered Dust Collection Systems for All Industries
6407 Barberton Ave. OLympic 1-1300 Cleveland 2, Ohio

See Where You Can't Look

(From page 112.)

conditions encountered thus far.

In every successful ITV installation the user has determined just what must be seen and the manufacturer's engineering recommendations were directed toward that specific need. Present day suppliers of closed circuit television equipment should be prepared to offer such engineering advice so that the user is not left at the mercy of his probable unfamiliarity with television equipment in achieving desired results.

Maintenance of closed circuit television equipment of the type illustrated consists mainly of cleaning the lens and camera tube surfaces. Frequency of cleaning will be governed by conditions under which the camera must operate, but a definite schedule should be maintained, probably on a weekly basis under average conditions. Dust accumulation elsewhere in the equipment should be removed, in the average case, once a month.

Because ITV equipment, such as that illustrated, is straight-forward in design and requires no critical alignment procedures for proper performance, service can be successfully accomplished by electrical maintenance personnel within the using organization. It is essential, however, that such personnel be familiarized with the equipment's operation.

Fire-Conscious Industries Use Vermiculite Protection

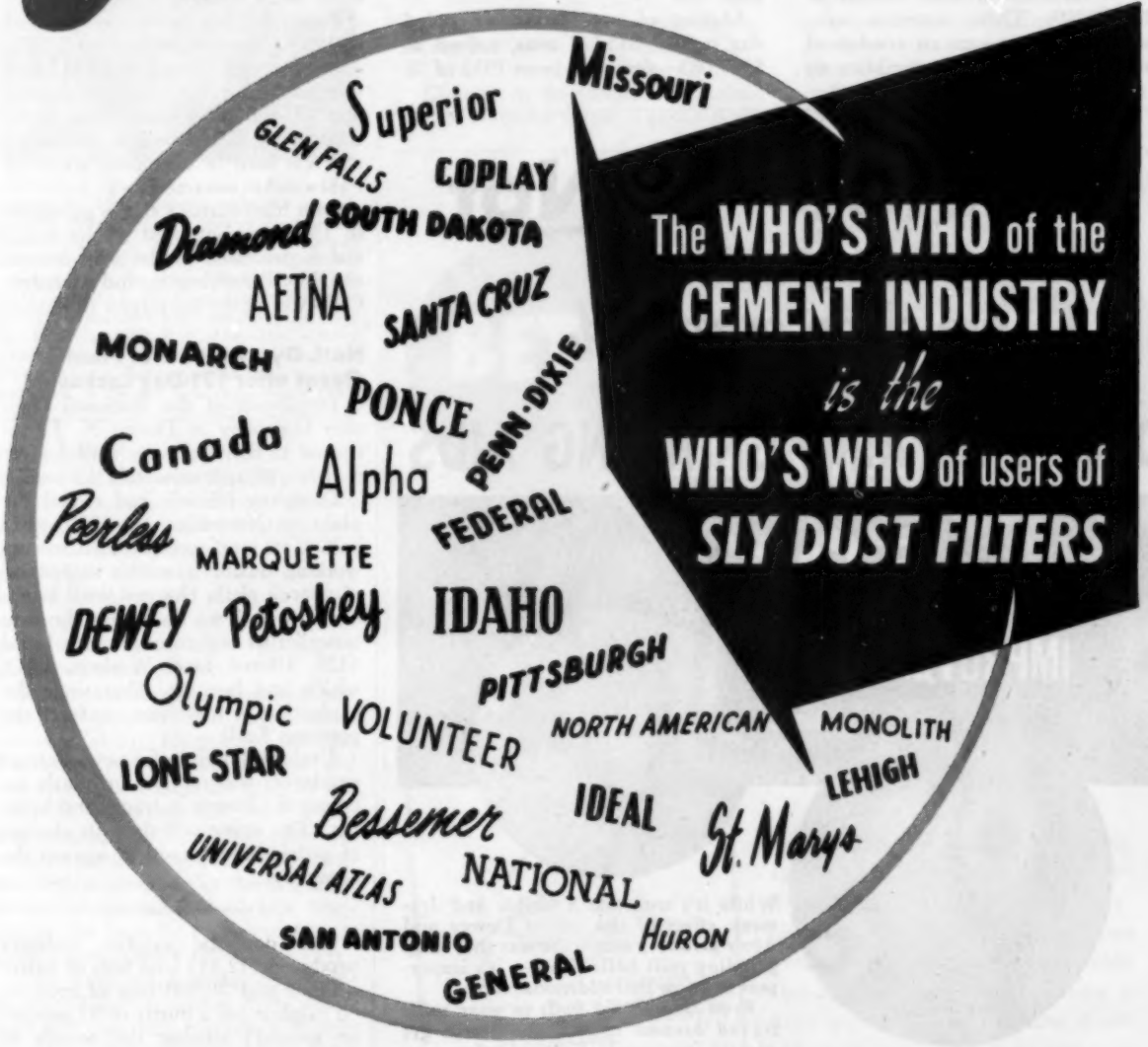
Fire-conscious industrial companies are rapidly modifying their plants to avoid the same kind of disastrous fire that leveled General Motors' Livonia, Mich., factory last August.

Vermiculite plaster fire barriers have already been erected by Northrop Aircraft and Douglas Aircraft in their California plants.

The walls are quickly and inexpensively installed by machine methods. They break up fire-dangerous open expanses into smaller sections where fires, should they occur, can be isolated and controlled.

Fabrica Dominicana de Cemento put its third kiln into production in February, doubling its daily production in the Dominican Republic from 3,000 to 6,000 bbl. Most of the equipment for the $1,000,000 kiln was furnished by American companies. Daily production in 1948 was 750 bbl.; the rate was raised to 3,000 bbl. in 1950. Annual capacity of this plant is now 1,984,000 bbl.

SLY Pioneers and Leaders in DUST CONTROL



The WHO'S WHO of the CEMENT INDUSTRY *is the* WHO'S WHO of users of *SLY DUST FILTERS*

• A trained Sly Engineer is near you to help lay out new additions or improvements. Write or phone.

Do you know of the New SLY DYNACLONE —self-cleaning, continuous operating, cloth-type Dust Filter?

For Rock Crushing—Raw Mills—Finish Mills—Pack Houses—Bulk Loading—Venting Silos.

THE W. W. SLY MANUFACTURING CO.

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NEW YORK • CHICAGO • ST. LOUIS • PHILADELPHIA • MINNEAPOLIS • DENVER
BIRMINGHAM • CINCINNATI • DETROIT • LOS ANGELES • BUFFALO • INDIANAPOLIS • TORONTO

Blast-Furnace Slag Industry Sets Production Record in 1953

The heavy demand for slag as a mineral aggregate, coupled with an uninterrupted supply of raw material during the year, resulted in the establishment of a new record tonnage processed by the iron blast-furnace slag industry. The output in 1953 was 30,511,603 tons, valued at $40,067,294, compared to the 1951 output of 26,899,376 tons, valued at $33,874,209. These statistics were compiled from a canvass conducted by the National Slag Association in co-operation with the Bureau of Mines. Included are the outputs of 45 companies operating 68 plants processing air-cooled slag, 16 plants processing granulated slag, and 20 plants producing expanded slag.

Screened air-cooled slag, the major product, increased 14 percent to 24,021,624 short tons, valued at $32,677,948. Of this total 89 percent was used as railroad ballast or as aggregate.

Output of unscreened air-cooled slag totaled 845,311 tons, valued at $581,083—decreases from 1952 of 38 percent and 22 percent, respectively. About 63 percent of the output was used as aggregate in highway and airport construction.

The output of granulated slag was 3,358,910 tons—an increase of 34 percent over 1952. Of this quantity, 42 percent was used as a raw material in the manufacture of hydraulic cement, 39 percent was used as road fill, and the rest for concrete-block manufacture and agricultural slag.

Expanded slag production reached in 1953 a new record high of 2,285,758 short tons, valued at $5,557,813. Output and value were 16 percent and 21 percent higher, respectively, than in 1952. The bulk of this material was used in the manufacture of lightweight concrete block.

Iron blast-furnace slag is produced in 15 states, but most of the material is processed in the steel centers of Ohio, Pennsylvania, and Alabama. Ohio was again the largest producer.

Whether or Not

grinding mill balls are clean or coated,

use

Dewey and Almy GRINDING AIDS

Grinding Aids for

- finish grinding of Portland cement clinker
- dry process grinding of cement materials
- wet process grinding of cement materials
- finish grinding of white cement clinker and other light colored materials

While it's true that a visible and dramatic effect of the use of Dewey and Almy grinding aids is the way they keep grinding mill balls clean — it's important to know this additional fact:

Even though the balls in your mills NEVER *become coated,* you'll still get greatly improved efficiency when you add a Dewey and Almy grinding aid! Added at the rate of 1 to 4 ounces per barrel of cement, Dewey and Almy grinding aids INCREASE MILL OUTPUT from TEN to FIFTY PERCENT, depending on type of cement, type of mill, fineness of grinding and other conditions.

WRITE FOR LITERATURE TODAY!
Construction Specialties Division

DEWEY and ALMY Chemical Company

Cambridge 40, Mass. • Montreal 32, Canada • Chicago 38 • San Leandro, Calif.

Natl. Gypsum's Dover Plant Opens after 131-Day Lockout

Employees of the National Gypsum Company at Dover, N. J., returned to their jobs on April 1 after a strike of approximately 12 weeks.

Company officials had closed the plant on November 18, 1953, after half of its employees decided to stop working during a week's suspension of a stock clerk, charged with insubordination. Two days later the firm canceled its oral contract with Local 4428, United Steel Workers, CIO, which had been in effect since the expiration of a written contract the previous April.

Under the terms of a new contract employees will receive an hourly increase of 12 cents in wages and benefits. The union will drop its charges of unfair labor practices against the company.

The domestic sulphur industry produced 472,445 long tons of native sulphur and 30,000 tons of recovered sulphur (of a purity of 97 percent or greater) during the month of March, according to reports of producers to the Bureau of Mines, United States Department of the Interior. Producers' stocks of native sulphur increased and at the end of March stood at 3,238,838 tons.

Giant Portland Cement Company's net income for 12 months up to September 30, 1953, was $1,384,882 ($1.07 a share); net sales were $9,165,161. Net income in 1953 was $747,296 (62c a share), and net sales were $5,622,114.

• Winners of top cash prizes in Dravo Corporation's 15th annual technical papers contest, Pittsburgh, Pa., receive their checks from Robert W. Marvin (right), chairman of the company's Junior Board of Directors, which sponsors the competition. Winners are (left to right) E. M. Hays, $200 third prize; C. W. Granacher, $300 second prize, and W. L. Price, $500 first prize. The winning paper, "Dravo Builds Floating Plant for Heavy Media Separation of Gravel," was published in Pit and Quarry in April, 1953.

Caterpillar's York Plant New Dual-Purpose Facility

An open house was held recently for the trade and daily press, to view the new Caterpillar Tractor Company plant at York, Pa. Guests were served luncheon and taken on a tour of the plant, which will (1) turn out replacement parts and (2) supply improved parts service.

L. C. Allenbrand, manager, outlined the purposes and objectives of the new facility. He pointed out that Caterpillar's investment in new and improved plant facilities since World War II, including the York plant, has totalled $150,000,000. He reminded his audience that 1954 marks the 50th anniversary of the first commercially successful track-type tractor by the founder of one of Caterpillar's predecessor companies.

The York plant includes approximately 770,000 square feet under roof and currently employs 650 people. Consideration in determining the plant's location were the availability of skilled personnel and suitable land and utilities, and the accessibility to eastern sources of quality steel.

Many new machines for operation in the plant were designed on the basis of experience in other Caterpillar plants, and make assembling jobs, previously accomplished by hand, now almost entirely automatic. Mr. Allenbrand pointed out, however, that the new facility is far from being automatic in its total operation.

H. J. MARSHAM, manager of the National Gypsum Company's plant at Fort Dodge, Iowa, for nearly ten years, has retired from that post. He had been with the firm for the last 18 years.

RICHARD G. TARBELL, formerly assistant plant manager, succeeds Mr. Marsham as manager. He has been in the service of the company for 15 years, working in the laboratory of the Savannah, Ga. plant, and later serving as board plant superintendent at the Baltimore, Md., branch.

Changes in the executive organization of National Gypsum at the Kansas Ordnance Plant at Parsons, Kans., are as follows: DEAN L. WEIGHMAN, controller; MILTON J. ARMSTRONG, director of design and development; C. B. COX, assistant director of design and development.

JOHN N. BRADFORD, special sales representative of the Alpha Portland Cement Company, has been appointed sales manager of the Birmingham sales district, according to an announcement by Charles P. Postelle, southern sales manager of the company. Mr. Bradford joined the Birmingham office staff of Alpha in May, 1945, as a sales representative.

TO MAKE
BETTER MASONRY
CEMENT

. . . use DEWEY and ALMY's
ALL-IN ONE
airalon

TWO CONVENIENT FORMS

Available in ready-to-use solution or as a water soluble dry powder packaged in 50 pound bags.

Airalon is a low cost air entraining agent and plasticizer specially formulated for masonry cement. Contains, in one easy-to-handle compound, the saponified resin acids and fatty acids needed to make a high quality masonry cement. Ratio of fatty to resin acids is constant, as is percentage of stearols (unsaponifiables). Air entrainment and plasticity is uniformly obtained.

D A Construction Specialties Division

DEWEY and ALMY Chemical Company

Cambridge 40, Mass. • Montreal 32, Canada • Chicago 38 • San Leandro, Calif.

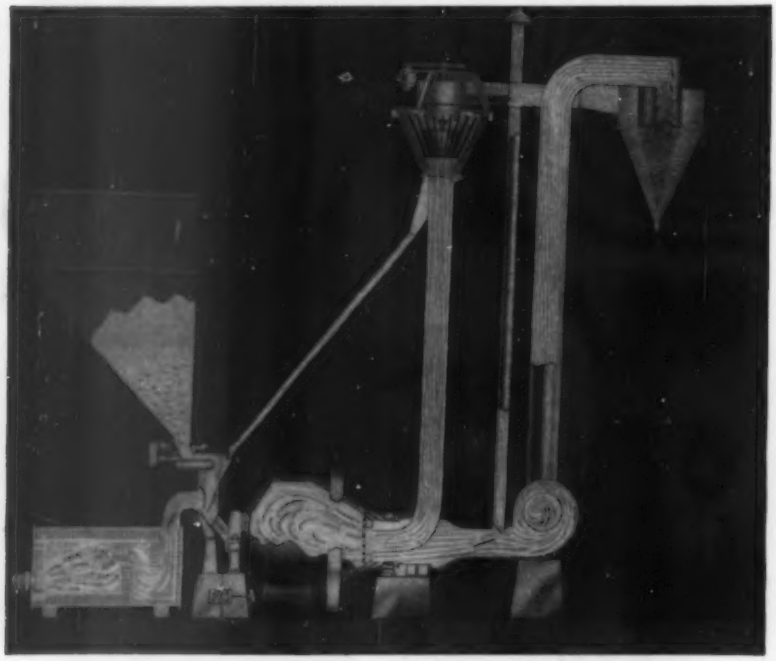
Calaveras Cement Employees Guests at Annual Picnic

More than 1,400 employees, their families and friends took part in the annual barbecue picnic of the Calaveras Cement Company staff late in May.

The picnic was held at "Frog Town," the site of Calaveras County's world-famous annual jumping frog jubilee.

Frank Grant, chief electrician at the Calaveras plant, was presented with a gold watch in recognition of his completion of 25 years in the service of the company. The presentation was made by William Wallace Mein Jr., Calaveras president.

Medusa Portland Cement Company, Toledo, O., and Local 175 of the A.F.L. Cement, Lime & Gypsum Workers Union recently agreed on a new one-year contract that provides a general increase of 5 cents an hour. The range of pay scale now varies from $1.65 to $1.70 an hour. Holiday premium pay is also increased from double time to double time and a half with the new agreement.



It DRIES
while it GRINDS
while it CLASSIFIES

The Hardinge *"Thermomill"* is an ingenious combination of Conical Mill, "Gyrotor" Air Classifier and air preheater. It dries, grinds and classifies—in a single system—materials carrying an appreciable amount of surface moisture, reducing them to dry, finely-ground products. Key item in the "Thermomill" is the new Hardinge "Gyrotor" Air Classifier, a separator with a wide range of fineness, controlled by simply changing the rotor speed. Overall classifier efficiency is higher than any attained by similar devices heretofore.

HARDINGE
COMPANY, INCORPORATED

YORK, PENNSYLVANIA • 240 Arch St. • Main Office and Works

New York • Toronto • Chicago • Hibbing • Houston • Salt Lake City • San Francisco

The Arizona Sand & Rock Company, Phoenix, Ariz., has begun the construction of additions to its plant. Included in the improvements will be a new rod mill to produce 100 percent crushed material.

SID H. ELIASON, president of Western Gypsum Company, Sigurd, Utah, was recently appointed chairman of the newly-created industrial safety committee of the Utah Manufacturers Association. J. EASTMAN HATCH, president of the Utah Sand and Gravel Company and Utah Lime and Stone Company, Salt Lake City, heads the service committee of the same association.

HARRY C. WEBB was recently appointed president of the Pan American Sulphur Company, Dallas, Tex. He was formerly executive vice-president at Houston.

HAROLD M. JACQUET succeeds Mr. Webb at Houston. Mr. Jacquet was previously with Jefferson Lake Sulphur Company as general superintendent in charge of production, and has spent the last 20 years in the sulphur industry.

SIDNEY J. SMITH has been appappointed to Kaiser Gypsum Company's Northwest District sales staff, specializing in the sale and promotion of gypsum wallboard and accessories. Mr. Smith joined Kaiser Gypsum in 1947, after several years in the export and lumber business in Southern California.

JAMES C. MCCLURE, formerly assistant vice-president of the Universal Atlas Cement Company of New York, has been elected vice-president and general sales manager, as announced by Charles B. Baker, president of the U. S. Steel Corporation subsidiary. Mr. McClure has been affiliated with Universal Atlas since 1927, serving in various executive capacities.

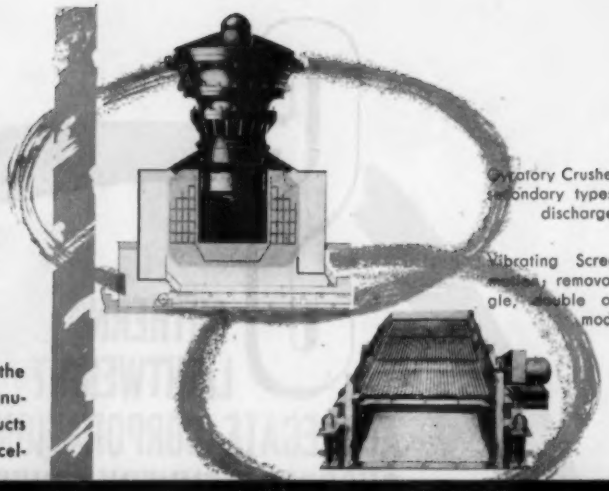
RICHARD T. LANTZ is now in charge of mining and research engineering for the North American Refractories Company, Cleveland, Ohio. Mr. Lantz has been affiliated with North American for 37 years.

ARCHIE H. ADAMS, formerly assistant plant manager of Universal Atlas Cement Company, has been promoted to the position of plant manager of the firm's Buffington, Ind., plant. Mr. Adams's successor in his former post is R. W. NYGAARD.

That's why:

Kennedy Machinery and Equipment is First Choice the World Over!

Good machinery just doesn't happen! It is the result of sound design, engineering and manufacture . . . characteristic of *all* KVS products . . . world-famous for their mechanical excellence and economy of operation, and over 50 years manufacturing, engineering and design experience.



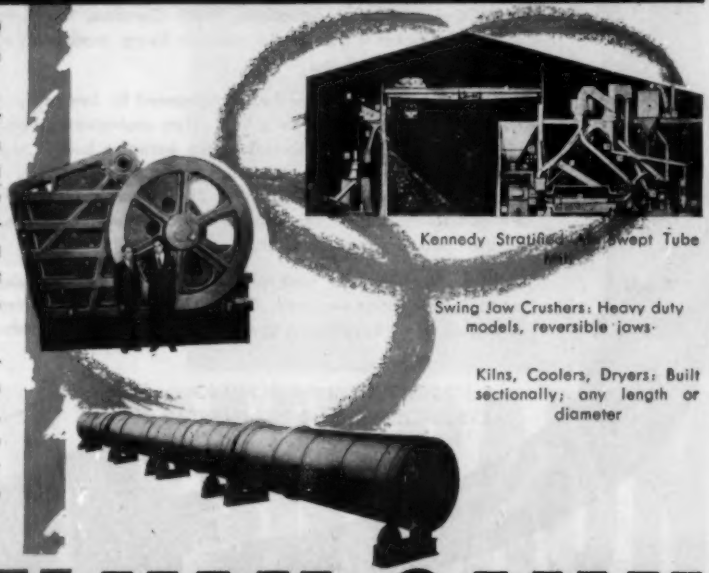
Gyratory Crusher, primary and secondary types, with double discharge outlets

Vibrating Screens: Four-way motion; removable mesh; single, double or triple deck models

only the best would do . . .

In their Danville, Pa. plant, occupying over 20 acres, KVS manufacture everything from a crusher to a complete cement, lime, or mining plant. Whether your requirements call for the addition or replacement of equipment, the modernization of an existing layout or the building of a complete plant, Kennedy engineers are at your service to assist in planning and supplying the installation best suited to your needs.

KVS engineers are available for consultation anywhere in the world. We invite inquiries regarding our machinery and equipment . . . literature is available upon request . . . to help you determine the BEST method of solving your individual problems. Get the KVS story *before* you specify!



Kennedy Stratified Air Swept Tube Mill

Swing Jaw Crushers: Heavy duty models, reversible jaws

Kilns, Coolers, Dryers: Built sectionally; any length or diameter

KENNEDY-VAN SAUN

Manufacturing and Engineering Corporation • Two Park Avenue, New York 16, N. Y. • Factory: Danville, Pa.

SOUTHERN LIGHTWEIGHT AGGREGATE CORPORATION CHOOSES KENNEDY EQUIPMENT

FOR "SOLITE" PLANTS AT BREMO BLUFF, VA. AND AQUADALE, NORTH CAROLINA

KVS Gyratory and Swing Jaw Crushers, Vibrating Screens, Rotary Kilns and Conveyors provide ideal equipment for capacity, controlled production and handling of a wide variety of aggregates. For example:

In the two modern plants of the Southern Lightweight Aggregate Corporation at Bremo Bluff, Va., and their subsidiary, Carolina Solite Corporation at Aquadale, North Carolina, this Kennedy equipment makes it possible to maintain heavy production schedules at low operating cost.

KVS machinery is designed and engineered for low cost production . . . peak capacity . . . long life . . . low maintenance cost. This world-famous equipment includes *more* exclusive built-in features than any other made . . . patented operational features . . . job-proved by plant operation records . . . that *assure* satisfactory service and freedom from time-consuming down time under the most severe operating conditions.

All KVS equipment is built to meet specific needs in any size, capacity or dimension required. Our sales-engineering department is available for consultation on any problems of aggregate production.

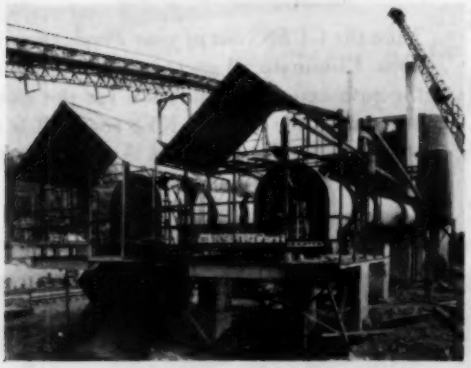
SEND FOR BULLETINS DESCRIBING
KVS MACHINERY AND EQUIPMENT

A close-up of the KVS screen and secondary crusher, employed in plant of Southern Lightweight Aggregate Corporation at Bremo Bluff, Va.

A view of the over-all Solite operation at Bremo Bluff, Virginia—the largest plant of its kind in the world producing a controlled lightweight aggregate.

KVS Ball Mill and Vibrating Screen in operation at Carolina Solite Corporation Plant, Aquadale, N. C.

New plant under construction for Carolina Solite Corporation at Aquadale, N. C., showing rotary Kilns from firing end.



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MANUFACTURING AND ENGINEERING CORPORATION

TWO PARK AVENUE, NEW YORK 16, N. Y.
FACTORY: DANVILLE, PA.

announcing...

the new KENNEDY RESEARCH CENTER

for Testing and Proving Basic Materials

Use the facilities of our modern, fully equipped Research Center . . . staffed with technicians . . . equipped with laboratory and the machinery and equipment to test all types of materials . . . processes . . . methods.

KVS have built a modern test plant, now in full operation at Danville, Pa., where equipment is available to conduct tests on cement manufacture, lime production, asbestos . . . rock, stone, and all types of minerals.

Results of these tests have established new methods, developed better ways of recovery and improved processes. Engineering data, so obtained will be regarded as strictly confidential.

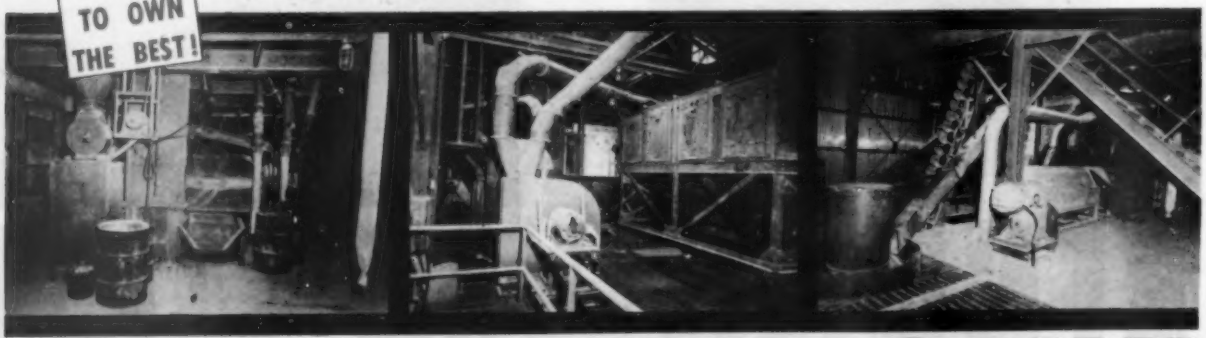
Safe, proven results obtainable through test runs involve crushing, grinding, screening and kiln operation, and provide fundamental insight on production problems regardless of the nature of the method or material being analyzed.

KVS RESEARCH, ANALYSIS and TESTING FACILITIES AVAILABLE ON A NON-PROFIT BASIS . . .

Take the GUESS out of your Production Problems. Eliminate all guess work in establishing the proper recommendation for the machine best suited for the job. KVS research is available on a non-profit basis. Arrangements can be made for a test run upon application.

IT COSTS LESS TO OWN THE BEST!

Air Swept Mill | Fan for Air Swept Mill and Material Hoppers | Top of Gyratory Crusher and Asbestos Graters



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40 PAGES of helpful information

on Recovering Dusts, Fly Ash, Mists, Fumes and other Suspensions from Gases.

This booklet summarizes

the important points design and plant engineers should know about Cottrell Precipitators . . .

- Basic types of Cottrell equipment.
- Principal elements in a Cottrell unit.
- Data on Mechanical and Electronic Rectifiers.
- Various types of Collecting Electrodes (rod curtains, corrugated plates, pocket electrodes, etc.).
- Typical ways of removing collected material.
- Various Shell Constructions (steel, concrete, brick, etc.).
- The effect of various factors on efficiency and performance.
- Data on CMP (Combination Multiclone-Precipitator) Units.

. . . and many other helpful facts on Cottrell design and operation.

Latest data from Western Precipitation on Cottrell Recovery Equipment

Do you have operations in your plant where gas-laden suspensions, wet or dry, are a problem? Such suspensions may be dropping on surrounding property, causing nuisance difficulties. Or perhaps important values are being lost in stack gases that can be profitably recovered. Whatever the nature of your recovery requirements, you will find this 40-page Cottrell booklet of great help. It contains up-to-date data on the latest advancements in the electrical precipitation field – prepared by the organization that pioneered the commercial application of Cottrell Electrical Precipitators almost a half century ago and has consistently led in new Cottrell developments.

A copy of this data-packed booklet will be sent free to engineers and other executives interested in recovery processes. Send your request to our nearest office.

For nearly 50 years Western Precipitation has carried on a continuous research and development program on Cottrell Electrical Precipitators, Multiclone Mechanical Collectors and other types of recovery equipment. We are not affiliated with any other company in the electrical precipitation field except our wholly owned subsidiaries, International Precipitation Corporation and the Precipitation Company of Canada, Ltd. We are equipped to serve you anywhere in the United States, Canada, and throughout the world!

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DESIGNERS AND MANUFACTURERS OF EQUIPMENT FOR COLLECTION OF SUSPENDED MATERIALS FROM GASES & LIQUIDS

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PRECIPITATION CO. OF CANADA, LTD., DOMINION SQ. BLDG., MONTREAL

Ni-Hard Grinding Balls Exceed 4 Times the Life

of forged steel balls

Below—NI-HARD GRINDING BALLS (⅞") used in cement clinker grinding test.

Left—Ni-Hard ball sectioned to show soundness.

AGAIN . . . in a prominent Pennsylvania cement plant . . . accurate records on clinker grinding prove NI-HARD® saves money.

Handling identical material under uniform conditions in 6'x22" tube mills, NI-HARD balls beat those of forged steel 4 to 1.

From make-up requirements shown in the tabulation, you can see how savings accumulate when Ni-Hard is used.

Test Ni-Hard in your own plant. We'll gladly assist you with practical experience gained in this field during the past 20 years. Let us send you a copy of an article entitled, "Alloy Iron Balls Set New Standard in Cement Grinding." Don't wait... write for it now.

Mill No.	Charge	Operating Hours	Bbls. Cement Produced	Make-Up Required 11/7/52 - 1/1/54	Ball Consumption lbs./Bbl.
1	⅞" Ni-Hard Balls	7485.06	284,058	4,000 lbs.	.0146
2	⅞" Ni-Hard Balls	7610.05	288,801	3,000 lbs.	.0104
4	⅞" Forged Steel Balls	7784.02	295,405	15,000 lbs.	.0508

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Staver Foundry Company
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EMBLEM OF INCO SERVICE

THE INTERNATIONAL NICKEL COMPANY, INC. 67 WALL STREET NEW YORK 5, N. Y.

Why this feeder doesn't cave in

● The reason is simply this: *The* PIONEER-ORO *Feeder is the most rugged feeder ever built.*

Take a look at its massive pans . . . cast from a special wear-resistant manganese steel, heavily ribbed, reinforced, and all the way from 3/16" to 1" thick, depending on width of feeder. The pans are supported by heavy, closely-spaced manganese steel rollers, keyed 3 to a heavy diameter shaft. Each shaft turns in 3 heavy-duty bearings rigidly supported on the feeder frame.

Takes heaviest dump loads

The PIONEER-ORO is designed for the roughest, toughest feeding jobs on earth. It withstands the impact of the heaviest dump loads. It shrugs off abrasion from hard ores, slag, flintrock, granite, and other coarse, heavy materials.

But the mighty PIONEER-ORO offers more than sheer, brute strength. It is a smooth-running, finely engineered unit designed to deliver a constant flow of heavy, abrasive material, with a minimum of maintenance. Even preventive maintenance costs are low.

Rivetless pans overlap and interlock

Pans, for example, overlap and interlock to provide added stability and stop leakage and spilling. Upturned end flanges also reduce loss of material. Drive links are cast as an integral part of the pan, so there are *no bolts or rivets that can loosen.* Easily replaced link bushings need no lubrication.

Sprocket teeth are readily reversed or replaced without taking the sprocket hub from the shaft or even disconnecting the pans. Like all other wearing parts, these teeth are cast from special wear-resistant manganese alloyed steel.

Supporting rollers and shafts can be removed, too, without disturbing the pans.

OTHER FEATURES

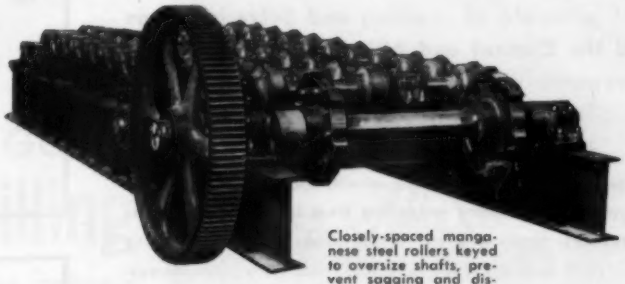
1. Patented lugs in pan links remove dirt, make links self-cleaning.
2. Feeder can be made to run in either forward or reverse direction.
3. Available in standard widths up to 84", widths in excess of 84" by special order, and lengths as required.
4. Made with 6", 9", 12" or 15" pan pitch (depending on width) to fit available head room.

PIONEER-ORO FEEDER
Capacities in tons per hour

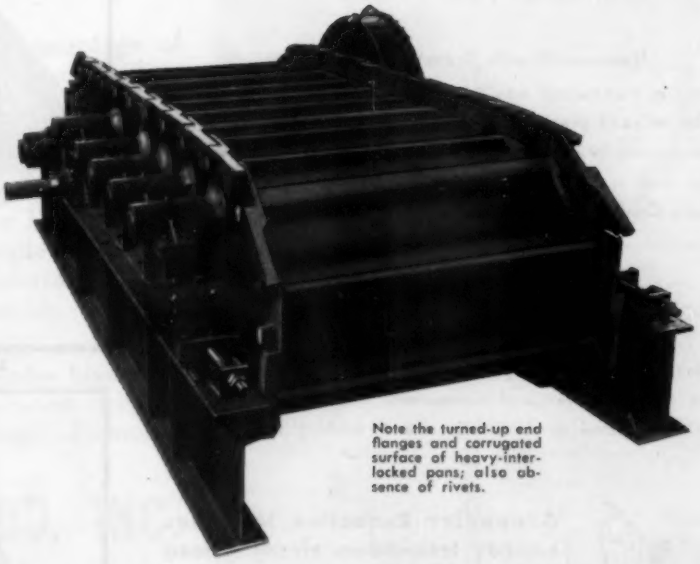
Travel per Min.	Width of feeder						
	30"	36"	42"	48"	60"	72"	84"
10'	74	108	147	192	300	432	588
15'	112	162	222	289	450	648	888
20'	148	216	294	384	600	864	1176
25'	186	270	368	482	750	1080	1472
30'	223	324	442	577	900	1296	1768

Ask Your Feeder Salesman These Questions

1. Are pans made from special manganese steel? How thick?
2. Are pans and links cast together so they are rivetless?
3. Can manganese parts be replaced without disassembling pans?
4. Will pans support themselves without rollers?



Closely-spaced manganese steel rollers keyed to oversize shafts, prevent sagging and distortion of pans.



Note the turned-up end flanges and corrugated surface of heavy-interlocked pans; also absence of rivets.

For further details and specifications regarding full line of PIONEER *Feeders, write Pioneer Engineering Works, Inc., Minneapolis 13, Minn. (subsidiary of Poor & Company, Chicago) or see your nearest* PIONEER *Distributor.*

BUY BOTH! HIGHER OUTPUT LOWER UPKEEP

Pioneer *Continuflo* EQUIPMENT

Pioneer Engineering Works, Inc., 1515 Central Ave., Minneapolis 13, Minn.
Subsidiary of Poor & Company • Chicago
Please send information on equipment checked.

☐ GRAVEL PLANTS	☐ WASHING PLANTS	☐ MECHANICAL FEEDERS
☐ ROCK PLANTS	☐ BITUMINOUS PLANTS	☐ VIBRATING SCREENS
☐ JAW CRUSHERS	☐ APRON FEEDERS	☐ BUZZER SCREENS (LIGHT DUTY)
☐ ROLL CRUSHERS	☐ ORO FEEDERS	☐ CONTINUFLO CONVEYORS

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MANUFACTURERS OF THE FAMOUS GRUENDLER HAMMERMILL SINCE 1885

CEMENT and ALLIED INDUSTRIES

Reduction Machinery

At It's Best!

Ni onto 70 years the Gruendler Swing Hammer Impact principle of crushing and pulverizing has served the Cement and Allied Industries in various problems with outstanding success.

Large Capacity Reduction Hammermill

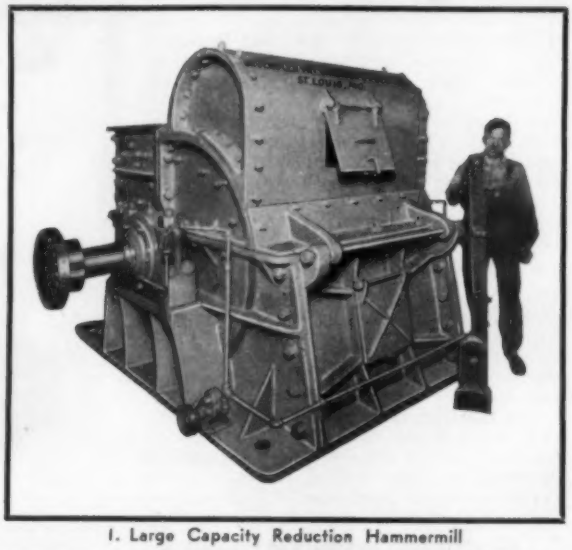
The large capacity reduction hammermill, known as our conventional type **for secondary reduction from large jaw or gyratory crushers** handling 8 to 10 inch minus products, reducing to 1 inch or ¾ inch minus for Tube Mill Feed. Very often increasing capacity of Tube Mills from 10 to 30%. **Note** the patented Dome Tramp Iron Catcher protective feature.

Hammermill with Traveling Breaker-Plate

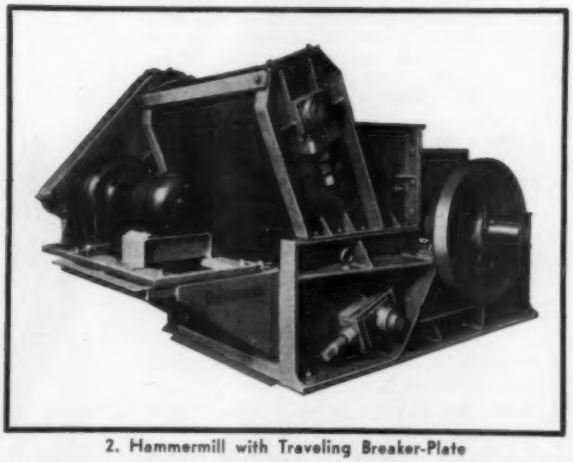
Gruendler Hammermill with Traveling Breaker-Plate **for handling moist or semi plastic Stone Shale, etc.** The moving Breaker-Plate prevents bridging in Hopper, and **acts as a Force-Feeder.** Often used as Primary Crusher, due to choking in other types of Primary Crushers. Its capacity is upwards of 500 tons hourly.

Gruendler Center-Feed "Impactor"

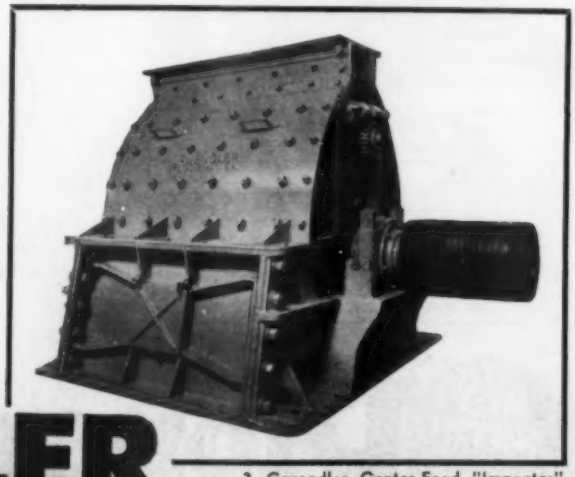
The Center-Feed often called the "Impactor" has patented deflector bar for operational in either direction. **For final reduction to ½ inch with increased percentage of fines,** also for recrushing stone from a conventional Hammermill. This combination is for greater increased production in overall crushing and grinding.



1. Large Capacity Reduction Hammermill



2. Hammermill with Traveling Breaker-Plate



3. Gruendler Center-Feed "Impactor"

Gruendler Reduction Machines embody tremendous strength, long life dependability for economical operation.

"BETTER LIVING THROUGH THE USE OF CEMENT PRODUCTS"

GRUENDLER

CRUSHER and PULVERIZER CO. • ST. LOUIS 6, MISSOURI

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Good Cement...

...is very apt to start with GOOD

Diamond Core Drilling

We emphasize the word "GOOD" because, unless a high percentage of core is recovered, the results may not be sufficiently informative

You can rely upon securing a high percentage of core from any Sprague & Henwood Contract Drilling Operation because our methods and equipment have been developed during more than sixty years of experience with thousands of successfully-completed contracts; a considerable amount of which has been for the Cement Industry. Today, we have a large force of expert operators and an ample supply of modern equipment, so that we can undertake almost any job—anywhere—on very short notice.

Besides exploratory drilling, from the surface or underground, our contract service includes blast-hole drilling, directional drilling, foundation-test drilling, grout-hole drilling and pressure grouting. Estimates submitted promptly on request.

SPRAGUE & HENWOOD, INC.

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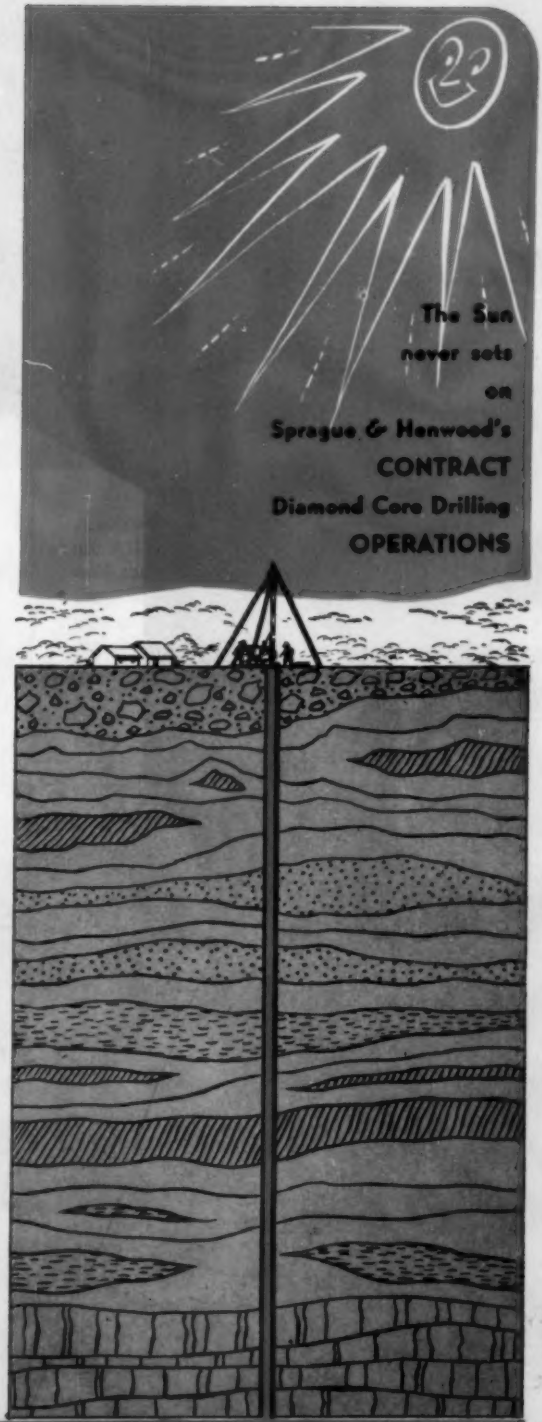


Leading Manufacturers, also, of High-Speed Diamond Core Drilling Machines, "Oriented" Diamond Bits and a complete line of Improved Accessory Equipment for Core Drilling and Soil Sampling. Write for illustrated catalogues containing complete specifications and all necessary working data on:

Auger Bits, all types
Bails, lifting
Ball-Bearing Waterswivels
Bits, Diamond
Bits, Blank
Bits, Chopping
Bushings, Rod & Casing
Casing, Flush Coupled
Casing Tops
Clinometers
Corebarrels, all types
Corebarrel Tops
Core Lifters
Couplings, Rod
Derrick Sheaves
Drill Rods
Drilling Machines
Drive Hammers
Drive Heads
Drive Pipe
Drive Pipe Couplings
Drive Shoes
Extensions, Core Barrel
Fishing Tools
Fishtail Bits
Flush Coupled Casing
Foot Safety Clamps
Hoisting Hooks
Hoisting Plugs
Hoisting Plug Reducers
Hoisting Rings
Hose, Waterswivel
Hose, Suction
Jar Lengths
Jaws, Safety Clamp
Lifters, Rod
Mud Bits
Pilot Reamers
Plugs, Hoisting
Pressure Testers
Protectors, Casing
Reamer Shells
Reducers, Rod
Rods, Drill
Rod Couplings
Rod Tops
Rose Bits
Safety Clamps
Sawtooth Bits
Sheave Wheels
Soil Samplers
Subs
Tops, Fishing
Testers, Sample
Testers, Pressure
Wash Plugs
Water Swivels

...For More

1 INSTALL AN AIR-QUENCHING COOLER

You'll get greatly reduced rotary kiln fuel costs with an Air-Quenching cooler . . . and surprisingly low installation costs. Horizontal operation eliminates need for a deep pit under discharge end. Cooler arrives in two pre-assembled sections. Easy to install. Air-Quenching shaking grate coolers isolate and capture the hottest secondary air above the cooling clinker for return to the kiln. True air-quenching of clinker (cooled rapidly, not gradually) reduces grinding costs. Low power and maintenance costs.

Get complete facts on cement plant modernization from the Allis-Chalmers representative in your area. Also send for Air-Quenching Cooler Bulletin 07B7869 and Bulletin 07B8040 on Air-Cooled Kiln Ends. Allis-Chalmers, Milwaukee 1, Wis.

3 WAYS You Can Modernize Your Plant

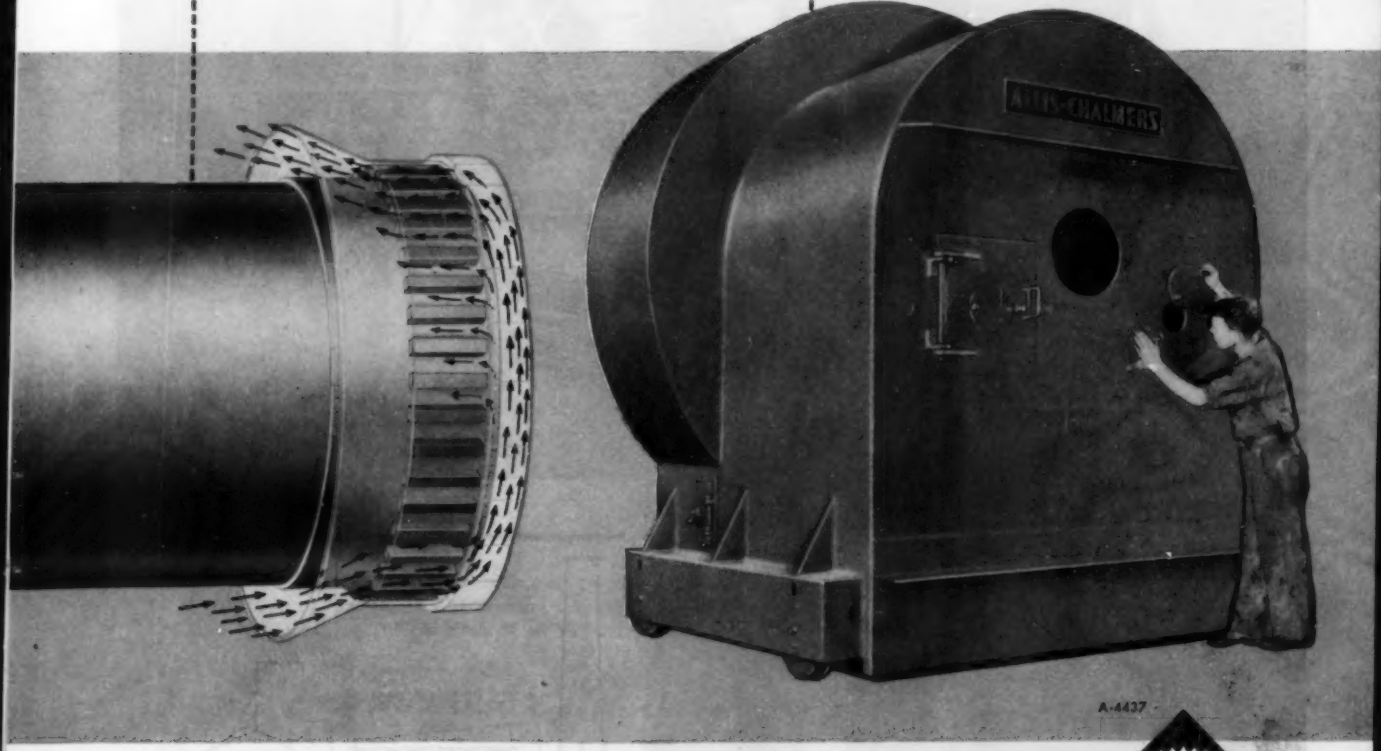
Profitable Cement Production!

2 INSTALL AN AIR-COOLED DISCHARGE END

This modernization improvement will actually pay for itself in 2 to 3 years in refractory savings alone! Big savings in downtime, too, because fewer shutdowns are required to replace end brick. You gain valuable production time. An Air-Cooled discharge end helps maintain a positive air seal between firing hood and kiln, resulting in fuel savings. Discharge end distortion is eliminated. Kilns now in operation can be modernized easily with an Allis-Chalmers Air-Cooled discharge end.

3 INSTALL A MOVABLE FIRING HOOD

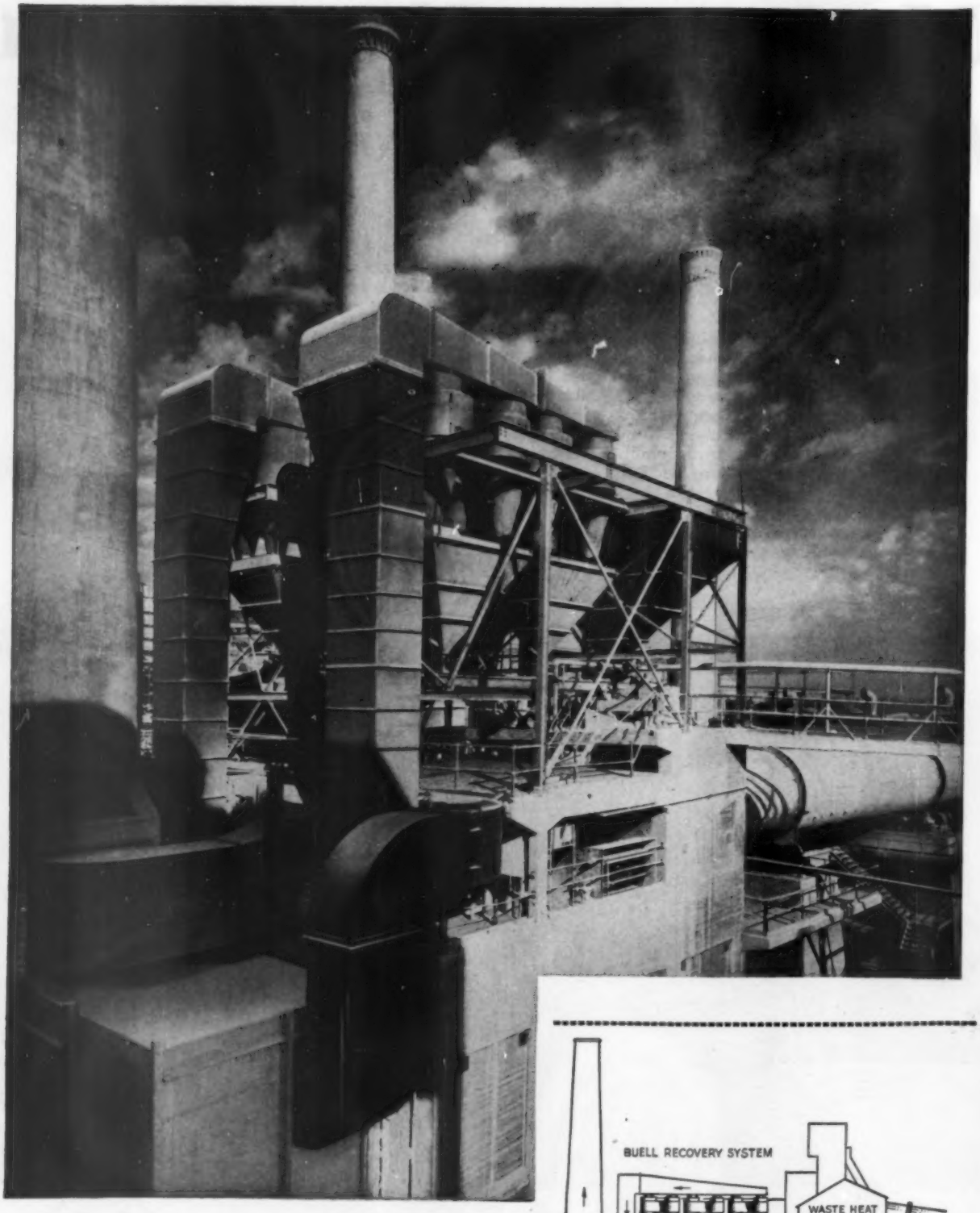
Another profitable way to modernize — an Allis-Chalmers movable firing hood will maintain an excellent air seal with the kiln, saving fuel by reducing hot air loss at kiln end and keeping out infiltering cold air. Movable design compensates for expansion and contraction of kiln shell. Allis-Chalmers firing hoods are built to use standard refractory brick lining. They're heavily constructed, to stay rigid throughout years of service, and have convenient access and inspection openings.

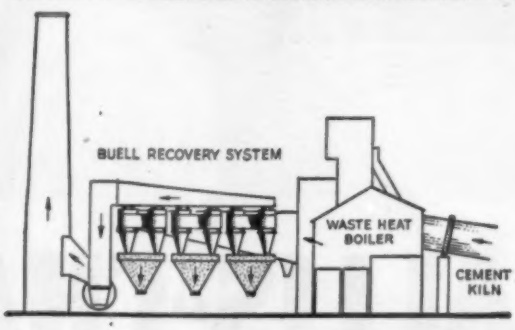


ALLIS-CHALMERS

A-C ALLIS-CHALMERS

In Cement and Lime Kiln





Dust Recovery...

BUELL TOPS THEM ALL

Buell Recovers More Dust

High Cyclone efficiency... with the exclusive Buell 'Shave-Off'... fits hand in glove with industry needs. Loss in the gas outlet consists mainly of alkalis, permitting the cement dust to be returned to kilns without any interruption to manufacturing operations.

Buell Cyclones Don't Plug

Large diameter cyclones and outlets just won't plug. All cyclones operate at same high efficiency... even gas distribution prevents overloading some cyclones while others loaf.

Wear Resistant, No Maintenance

Heavy steel plate construction and large diameter cyclones cut the abrasive effect of rock dust to a minimum. Cost of shutdowns, clogging and repairs at a practical zero.

BUELL 'SF' ELECTRIC PRECIPITATOR

for the collection and recovery of fine dusts, fumes and vapors features design advancements resulting in superior performance. Thoroughly proven by many installations it is available in sizes and types to meet specific requirements.

We will be glad to consult with you on your dust recovery problem. Buell Engineering Company, 70 Pine Street, Dept. New York 5, N. Y.

buell

Engineered Efficiency in DUST RECOVERY

Specify These Alloys for Super-Service

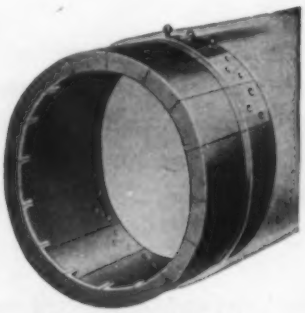
PYRASTEEL for high temperatures

EVANSTEEL for hard service

PYRASTEEL KILN ENDS

PYRASTEEL Kiln Ends are used by a majority of cement producers to reduce heat losses and improve kiln operation. They render tight sealing possible and result in substantial fuel savings. Segmental construction . . . easy to install . . . extremely durable.

Unit segments are easy to install or replace.



PULVERIZER HAMMERS

During recent years, hammer mill manufacturers have been searching for a better material for pulverizer hammers. EVANSTEEL has proved to be the answer to utmost requirements.

EVANSTEEL SAFETY HOOKS

When load is applied, the hook closes and locks automatically. Furnished with any type crane connection.

FEED PIPE CEMENT

PYRASTEEL Feed Pipes, either straight or curved, not only have great resistance to heat and oxidation but also high resistance to abrasion. Once installed, they last for years.

CLINKER COOLER →

For clinker cooler work, PYRASTEEL has never yet failed in any application up to 2000° F. PYRASTEEL is used on all makes and for any method of cooling.

PYRASTEEL KILN END, Feed End.

Prevent burn-outs. Installed without any machine work.

DRAG CHAIN

Many industries, particularly cement, using rotary kilns, find that PYRASTEEL drag chains, even when they work entirely immersed in molten clinker, will stand the hardest kind of service. They do not warp, break or oxidize.

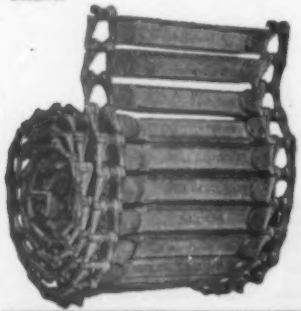
Write for Bulletin No. 14 H.B. It gives technical data on economical applications of PYRASTEEL.

SCREEN PLATES

EVANSTEEL heat treated Screen Plates are accurately made. They fit into position without machining, and will last indefinitely.

WIRE ROPE SOCKETS

EVANSTEEL Wire Rope Sockets have been used for 30 years without the record of a single failure. They have proved to be the strongest type of sockets on the market.



CONVEYOR BELT

PYRASTEEL Conveyor Belts are furnished in a full range of styles and sizes for every purpose. Strongly and accurately made for high temperature applications.

CHICAGO STEEL FOUNDRY COMPANY

Makers of Alloy Steel for Over Forty-five Years

Kedzie Avenue at 37th Street — CHICAGO 32, ILLINOIS

PEABODY gives you...

Double Barrel EXPERIENCE!

. . . to produce hot gases efficiently
and to vent gases without product loss . . .

Peabody engineers have had years of experience solving problems of controlled pressure combustion and gas scrubbing, cleaning, cooling, and absorbing. The multiple impact of this specialized knowledge in two such separate *(but often closely related)* fields offers unusually successful and profitable product and process improvements.

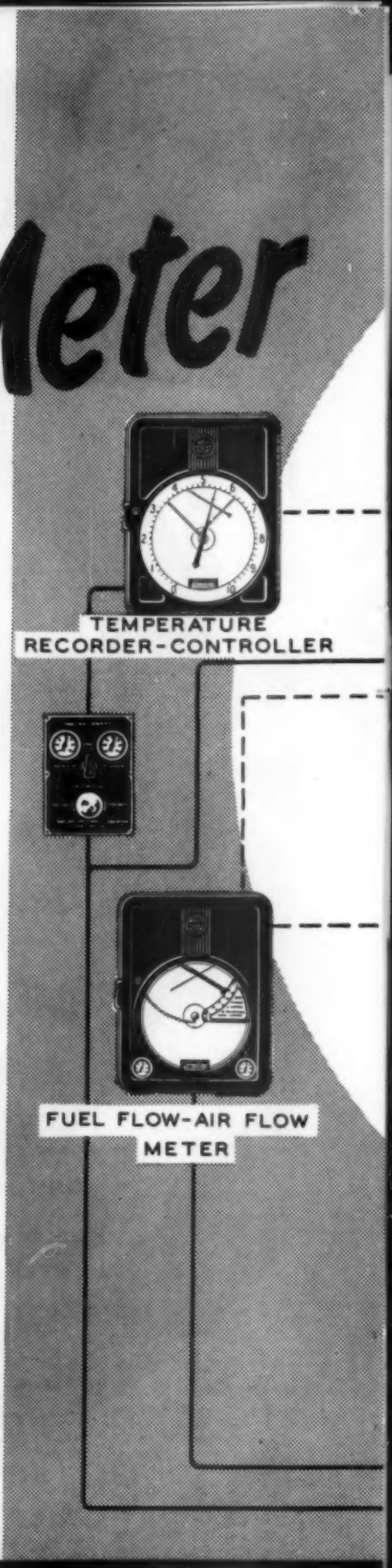
OFFICES IN PRINCIPAL CITIES

PEABODY
ENGINEERING CORPORATION
580 FIFTH AVENUE • NEW YORK 36, N. Y.
Manufacturers of all types of combustion equipment, direct-fired air heaters, gas scrubbers, coolers, and absorbers.

PEABODY LIMITED • LONDON, S.W. 15, ENGLAND

561

Now! "Self-Serve" Operation - Bailey Meter



Your "Self-Serve" Bailey controlled rotary kiln literally thinks for itself and reacts quickly and correctly to any changes in operating conditions. You get:

1. **Economical Operation**—*Gives maximum production from every unit of fuel you burn* because Bailey Combustion Control closely guards Fuel-Air Ratio, Hood Draft, Fuel Feed, Clinker Cooling and Temperature of Air for Combustion.

2. **Uniform High Quality of Product**—Accurate measurement and control of Kiln Speed, Burning Zone Temperature, Combustibles Content and Oxygen Content . . . *for a high grade product, consistently.*

3. **Minimum Maintenance**—Uniform excess air conditions and constant temperatures *prolong the life of your kiln.* Costly refractory repairs and wear and tear on auxiliary equipment are reduced to a minimum.

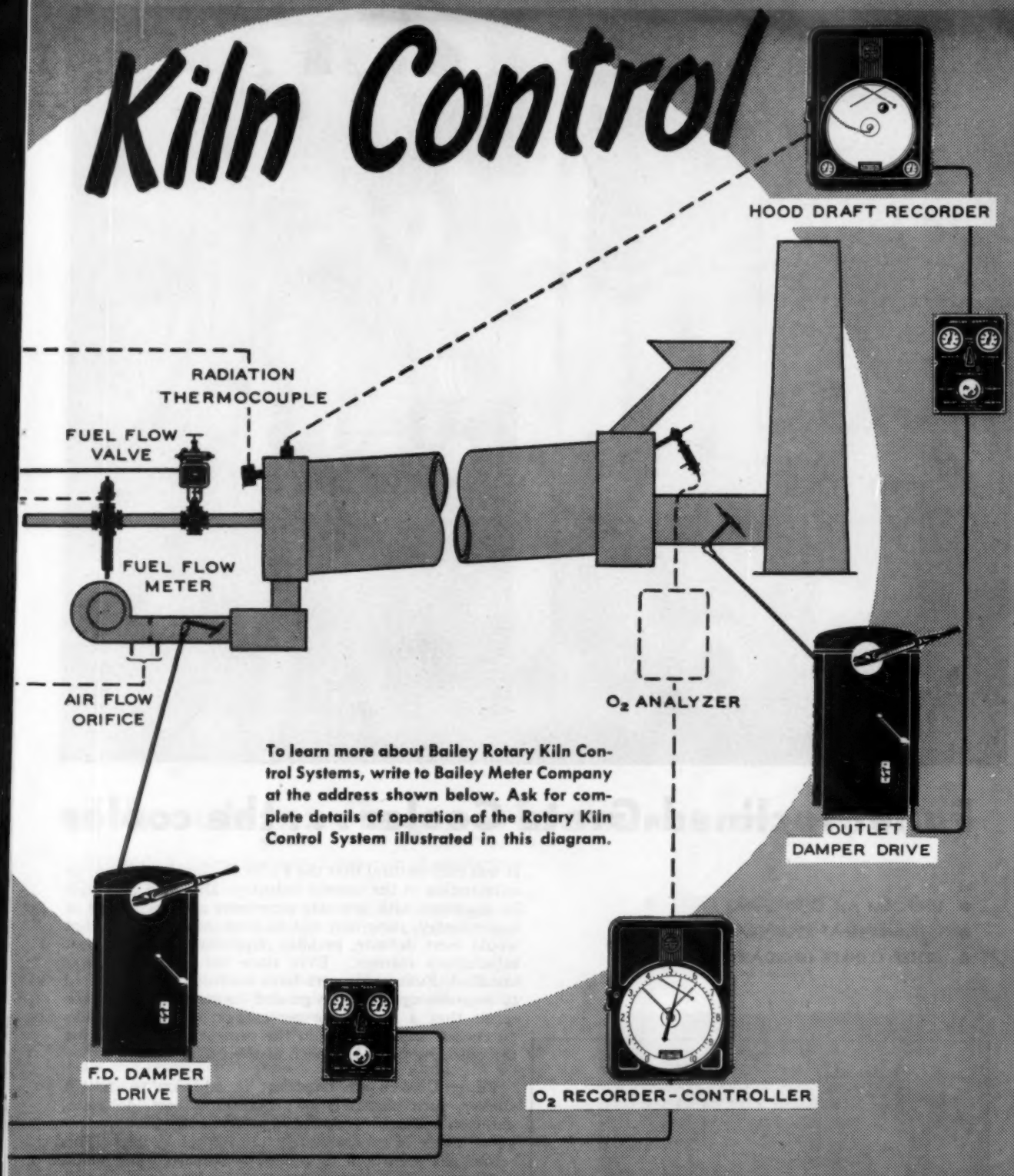
The accompanying diagram shows one way in which Bailey instruments and controls can give you a "Self-Serve" Kiln. Other arrangements to suit the requirements of any rotary kiln are available.

Bailey Meter Company maintains a staff of engineers who are experts in the control of rotary kilns. Let one of these men help plan a control system to give you a "Self-Serve" rotary kiln.

P-23

Bailey Meter Company

Kiln Control

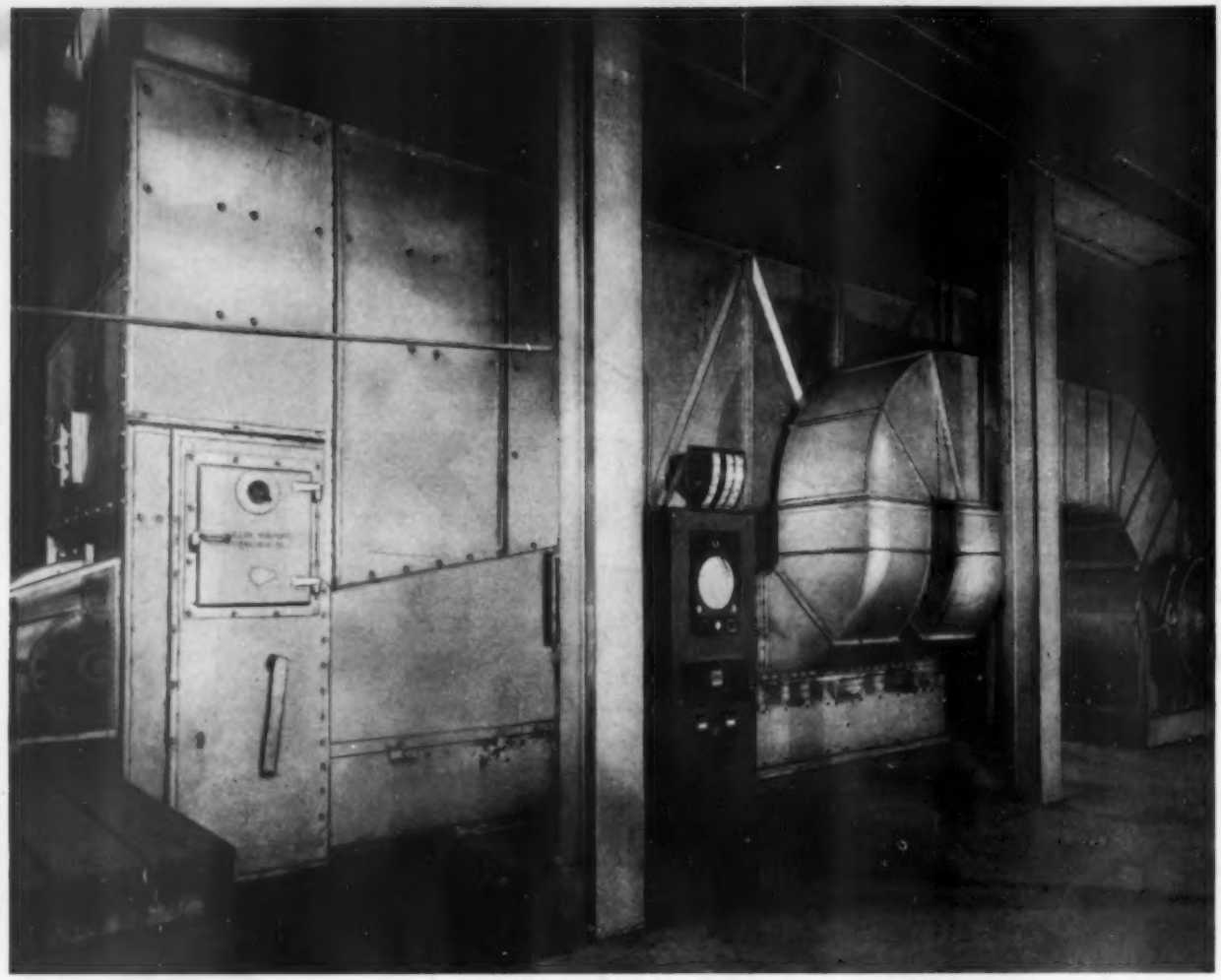


To learn more about Bailey Rotary Kiln Control Systems, write to Bailey Meter Company at the address shown below. Ask for complete details of operation of the Rotary Kiln Control System illustrated in this diagram.

Meters and Control Systems for Process Plants

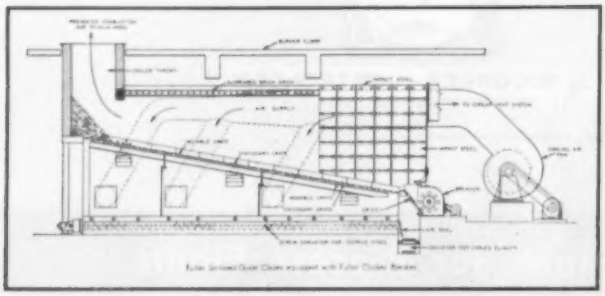
1051 IVANHOE ROAD • CLEVELAND 10, OHIO

Bailey Meter Company Limited · Montreal



Fuller Inclined-Grate Cooler . . . the cooler

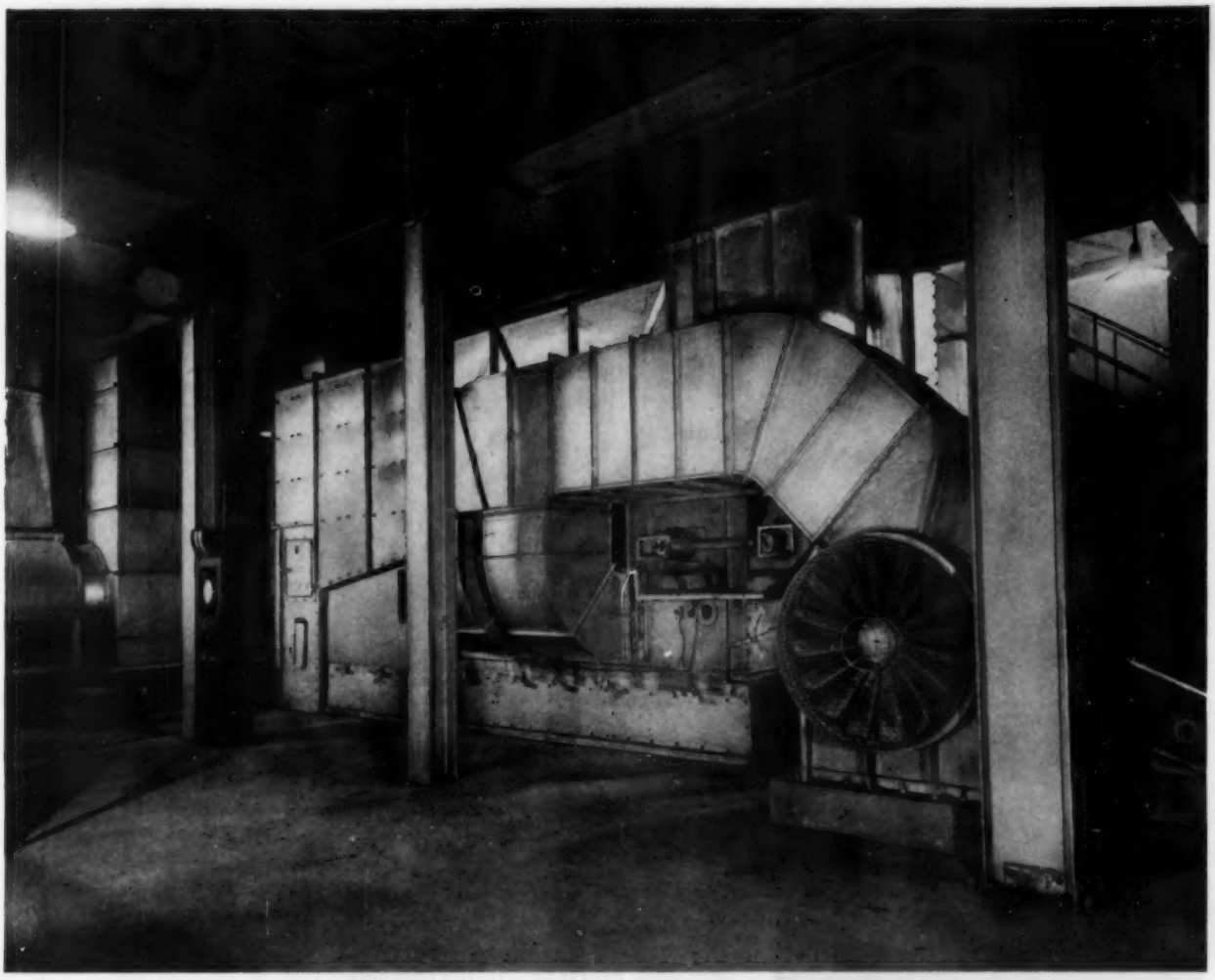
- UNIFORM AIR QUENCHING
- EFFICIENT HEAT RECUPERATION
- BETTER CLINKER GRINDABILITY



CO-29T-2302

It was only natural that the Fuller Cooler should become outstanding in the cement industry. Designed and built by engineers with intimate experience and knowledge of the industry, their aim was to produce equipment that would meet definite, peculiar requirements in the most satisfactory manner. Ever since the first cooler was installed, Fuller engineers have continually endeavored to improve upon its design and construction, with the result that a very large percentage of clinker coolers purchased and installed in the cement industry during the past few years has been of the Fuller design.

Fuller Coolers are handling, in addition to cement clinker, such materials as pebble lime, ores, dolomite, and iron nodules. Installed capacity is handling materials at a rate of approximately 138,700 tons a day. This record has been built on a basis of advanced and sound engineering . . . engineering that enables every installation to operate at maximum efficiency with minimum maintenance. Once a Fuller Cooler is installed, and additional cooling capacity is required, other Fullers are



with outstanding performance records

purchased . . . repeat business, a sure sign of satisfactory performance.

Fuel savings. Users of Fuller Coolers have reported savings as high as 25 percent, due to recuperated heat returned to the kiln or furnace.

Fast, effective air-quenching. This feature of the Fuller Cooler allows the user to obtain specific quality effects when this result is required.

Increased grindability of cement clinker. Laboratory tests and reports from users confirm this ability of the Fuller Cooler.

Why not take advantage of Fuller's many years of experience in materials handling and cooling. A talk with a Fuller Engineer may lead to more profitable operation in your plant.

Bulletin CO-5 illustrates and describes this equipment. Send for your copy today.

- LOWER FUEL COSTS
- HIGH-TEMPERATURE COMBUSTION AIR

FULLER COMPANY, Catasauqua, Penna.

BRANCH OFFICES: CHICAGO • SAN FRANCISCO • LOS ANGELES • SEATTLE • BIRMINGHAM

1 Crusher that does the work of 2 or more!

WILLIAMS
HEAVY DUTY
Hammer Mills

One Williams Hammer Mill will do your complete crushing job in a single operation—reduce production costs as much as half—save up to 75% of initial equipment expense.

- √ No primary or secondary crushers required.
- √ Eliminates extra drives, conveyors and other equipment, foundations and housings for additional machines.
- √ Cuts manpower, downtime, maintenance, parts replacement, power requirements and other operating costs.

There's A Williams Hammer Mill That Fits YOUR Needs Exactly

SUPER-SLUGGER . . . Crushes stone as big as a 2½-yard dipper can handle, and reduces them to 1½", ¾", or down to agricultural limestone, **in one operation!** Up to 550 ton hourly capacity.

SLUGGER . . . Makes 1½", ¾", or agstone from 10" stone in one operation! Output up to 100 tons hourly.

NF & GA MODELS . . . Reduces 4" to 6" stone to any size from ½" to 20 mesh. Capacity up to 200 tons hourly.

Send For Catalog Today

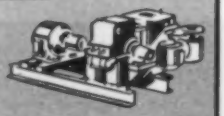
WILLIAMS PATENT CRUSHER & PULVERIZER CO.
802 ST. LOUIS AVE. • ST. LOUIS 6, MO.

WILLIAMS LINE IS COMPLETE

ROLLER MILLS—IMPACT and DRYER MILLS, for fine grinding to 400 mesh or micron sizes.

AIR SEPARATORS—any type, for precision control and high production in fine grinding.

VIBRATING SCREENS—in any size for any job. 1 to 3 decks, open or enclosed.



HELIX-SEAL MILLS—for dust-free grinding, and for wet, sticky, greasy materials.

COMPLETE "PACKAGED" PLANTS—for crushing, grinding, separating.

WILLIAMS

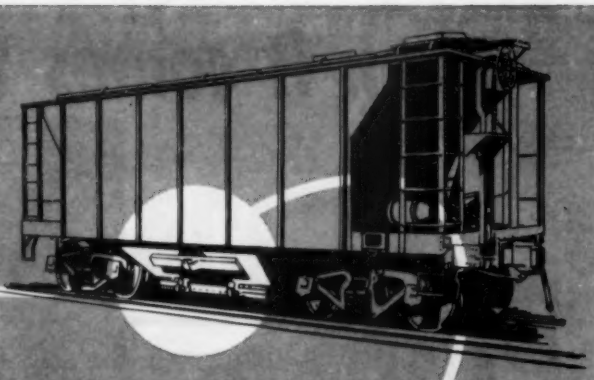
CRUSHERS GRINDERS SHREDDERS

OLDEST AND LARGEST MANUFACTURER OF HAMMER MILLS IN THE WORLD

ELIMINATE

CAR UNLOADING PROBLEMS

WITH A CLEVELAND VIBRATOR AIR OR ELECTRIC



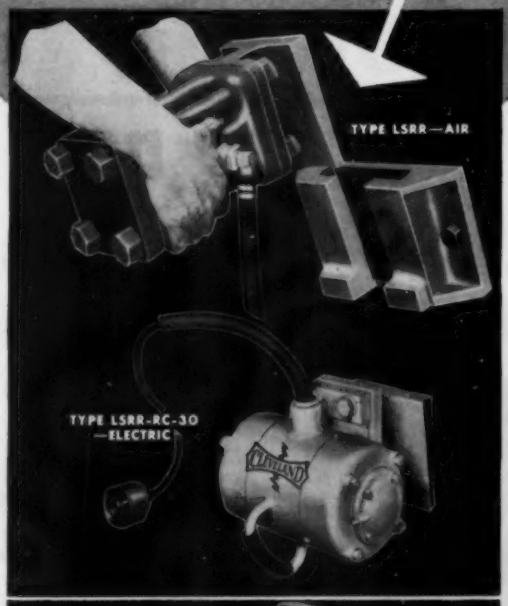
- IT'S EASY
- IT SAVES YOU MONEY
- IT'S QUICK

CLEVELAND pneumatic and electric vibrators are specially designed to solve your railroad car unloading problems.

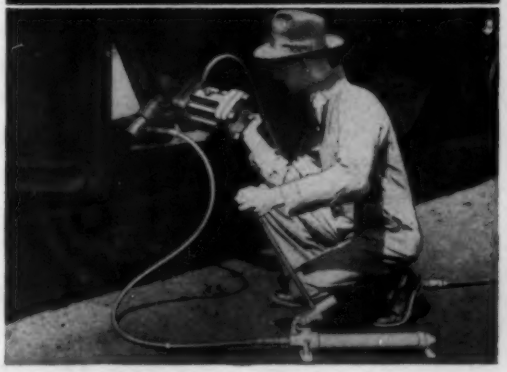
Our air-powered and electric vibrators are equipped with dove-tail grips which fit the female brackets that are standard equipment on most covered hopper railroad cars. They're also obtainable with hydraulically operated clamping device for attachment to any structural member of the railroad car.

These are also multi-purpose vibrators, ideal for use where only periodic vibration is required. Quick-change female brackets are available for use on your bins or hoppers.

A CLEVELAND vibrator, air or electric, will help you effect greater economy and smoother production.



TYPE HCRR FOR USE ON ALL TYPES OF RAILROAD CARS ▶



THE CLEVELAND VIBRATOR COMPANY
2710 Clinton Avenue • Cleveland 13, Ohio

☐ AIR ☐ ELECTRIC

For unloading:_____

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Name_____ Position_____

Company_____

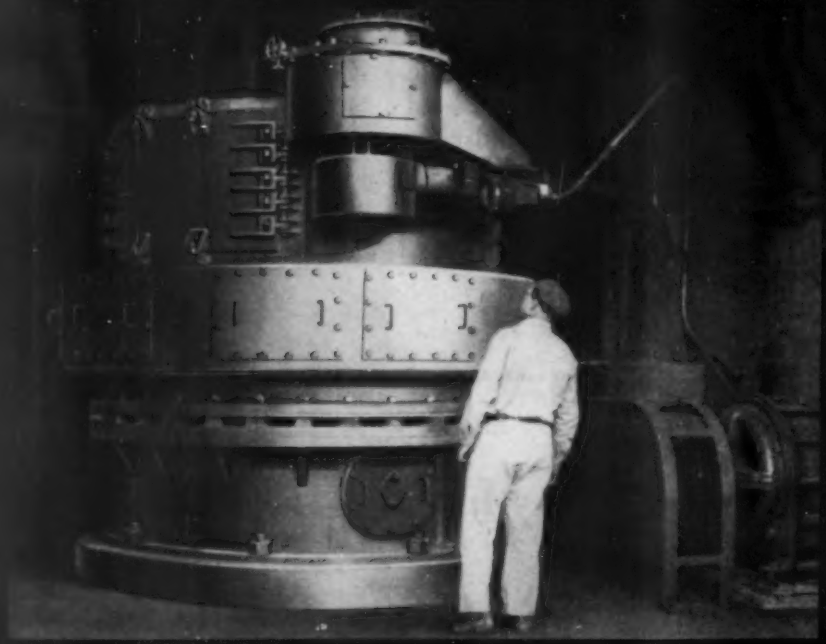
Address_____

City_____ Zone____ State_____

when it comes to PULVERIZING

you need all 3

coal pulverizing

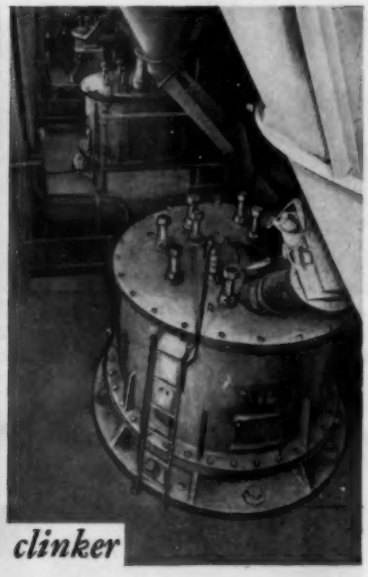


In plant after plant, B&W Type E Pulverizers are demonstrating an ability to give long and continuous service at the capacity required for maximum kiln production, with reduced operating costs. Heart of the B&W Direct-Firing System for rotary kilns, the Type E Mill is compact and self-contained . . . uses grinding elements made of wear-resistant, long-life alloys, with grinding balls held to close spherical tolerances. Service-proved features include high availability, uniform delivery of coal, low maintenance and ability to handle high-moisture coals.

COAL · RAW GRINDING · CLINKER

MAXIMUM CAPACITY
HIGH QUALITY PRODUCT
ECONOMY

raw grinding



clinker

The B&W Closed-Circuit Raw Grinding System — also with an outstanding record of service—eliminates the need for separate drying equipment. Cement rock, limestone, shale and other raw materials are ground and dried simultaneously within the System. Its Type B Pulverizer—also widely used for clinker grinding — delivers maximum capacity of product with low power demand. With this mill, maintenance costs are sharply reduced due to the uniform wear and long life of the tough, alloy grinding elements. Space requirements are smaller because this compact, yet powerful mill provides for higher capacity in equal space.

For the ultimate in kiln firing, raw grinding, clinker grinding, you can rely on B&W. The Babcock & Wilcox Company, Boiler Div., Process Equipment Dept., 161 East 42nd Street, New York 17, N. Y.

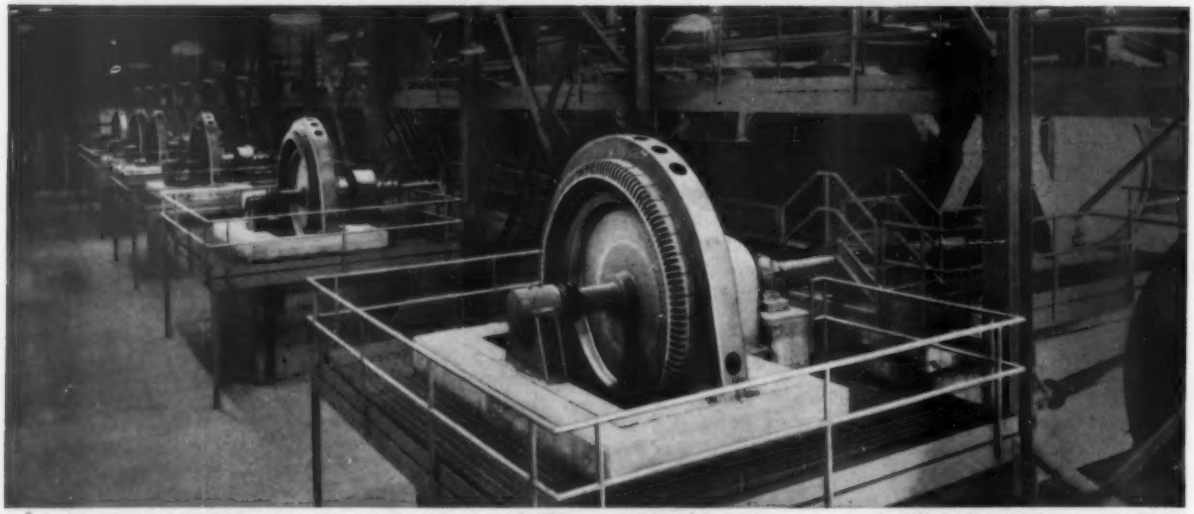
BABCOCK & WILCOX

C-210

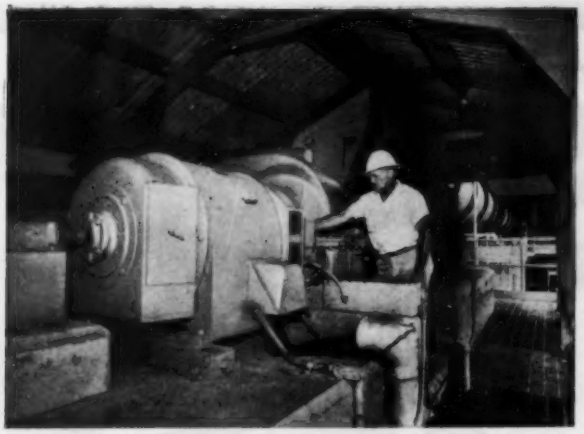
ENGINEERING REPORTS:

1 **ON-THE-SPOT SEPARATION** is done on this barge, which floats in a man-made pond near the Bunnell plant. Walking dragline (in background) dumps sand containing coquina shell into bins. These are five of twelve totally enclosed fan-cooled G-E Tri-Clad* gear-motors that keep conveyor loads moving to the screening process—in this corrosive atmosphere.

Lehigh Portland Cement Company's



2 **HIGH POWER FACTOR** helps plant operate economically. Three of these 700-hp, 180-rpm, 4000-volt synchronous motors drive primary wet ball mills that pulverize raw material; three others grind cement clinker after burning.



3 **KILN-SPEED CONTROL** over wide range is made possible by G-E adjustable-voltage d-c drives. Each kiln uses a 125-hp motor, and an electrically co-ordinated feeder motor.

4 **RELIABLE POWER SUPPLY** for kiln drives includes G-E 1000-kva load-center substation, two G-E synchronous m-g sets, and a-c and d-c control (background).

5 **DEPENDABLE POWER-SWITCHING** is provided by 4160-v metal-clad switchgear in a pressure-ventilated room. Vertical-lift design means you ***see*** when breaker is disconnected.

6 **CONTINUOUS FLOW** of finished cement through packhouse is aided by this G-E Tri-Clad motor driving bagging machine, and gear-motor driving conveyor for bagged cement.

*Reg. trade-mark of General Electric Company.

new plant powered by G-E system

G-E drives help maintain fast, smooth output of coquina-shell Portland cement

To help relieve the prevailing cement shortage in Florida, the Bunnell plant of the Lehigh Portland Cement Company has been completed with a production capacity of 4000 barrels a day. Here, for the first time in the U.S., coquina shell is being used in the manufacture of Portland cement.

In cooperation with F. L. Smidth & Co. engineers, General Electric cement industry application engineers developed a complete electrical system integrated with each plant process to facilitate a smooth-flowing, continuous operation. Each step, carefully linked with an efficient materials-handling system, is powered and controlled by G-E drives. Success of this coordinated planning is evident with today's fast-moving production flow.

REACH PEAK EFFICIENCY THROUGH ELECTRIFICATION

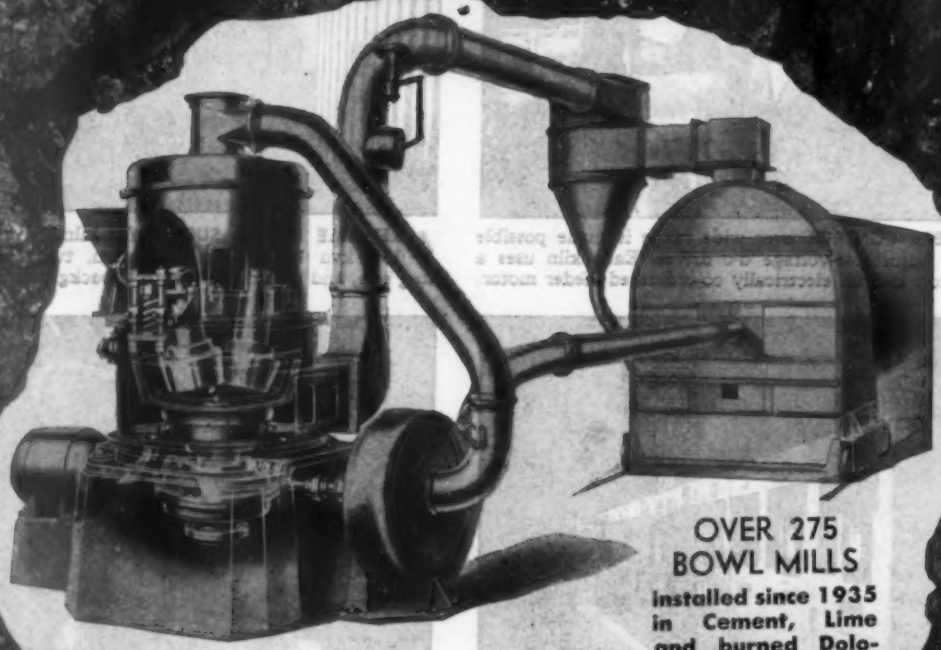
Use G-E engineering aid early in your electrical modernization planning to avoid production bottlenecks, assure optimum output. Contact your G-E Apparatus Sales Office for Bulletin GEA-5748 or write to General Electric, Section 658-13, Schenectady 5, New York.

Engineered Electrical Systems for the Rock Products Industry

GENERAL ELECTRIC

Modernize Your Cement Production

BOWL MILL FIRING



OVER 275 BOWL MILLS
installed since 1935 in Cement, Lime and burned Dolomite fields alone

RAYMOND Bowl Mills are pulverizing more than 12½ million tons of coal annually for direct firing applications on cement, lime and dolomite kilns, and industrial furnaces.

The widespread use of Bowl Mill Firing is indicative of industry's appraisal of this modern unit in terms of operating economy and dependable service.

It offers the following important advantages:

Handles coal of any grade or moisture content
Easily adjusted or lubricated while running
Sturdily built for continuous 24-hour operation
High availability and wide capacity range
Uniformity in grind and complete firing control

The bowl or grinding chamber revolves around the rotating rollers — a unique feature that results in maximum grinding efficiency. The centrifugal action forces the coal between the pulverizing elements constantly — no waste motion or dead spots. Elimination of metal-to-metal contact between grinding surfaces reduces wear to a minimum.

Write for Bowl Mill Catalog #62

Bulletins ON REQUEST

COMBUSTION

RAYMOND DIVISION

with RAYMOND EQUIPMENT

WHIZZER SEPARATION

The exclusive Whizzer feature is what makes the "difference" in the performance of the Raymond Mechanical Air Separator.

The wide sweep of the revolving whizzer blades helps to distribute the powdered material in the air stream, and insures closer separation of the fines, cleaner tailings and a consistent uniform product.

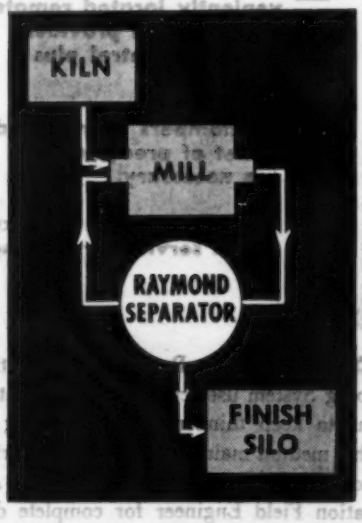
This is important in classifying cement — either raw mix or clinker — as it gives better control over specific surface areas in making various grades. It also provides a greater fineness range — and with a Double Whizzer Separator, you can produce standard grades or high early strength cements by an outside adjustment while the machine is running. No need of shutting down to make internal changes.

The overall economy of the Raymond Separator is a factor in keeping down the per-barrel cost of cement. Low power requirements, minimum maintenance, increased mill output in closed circuit operations, and long service life, all help to make the Raymond Whizzer Separator a sound capital investment.

RAYMOND DOUBLE WHIZZER
Mechanical Air Separator

Available for various capacities in sizes of 4 Ft. to 18 Ft. Diameters — Also 30-Inch Separator for laboratory or small commercial operation.

NEW CATALOG No. 71



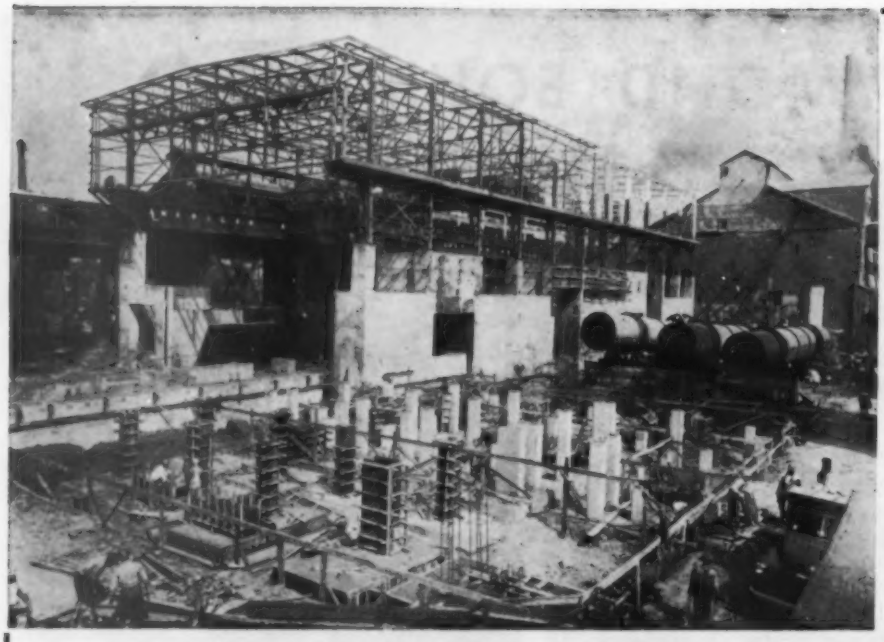
The Raymond Whizzer Separator is an important link in the closed circuit operation of tube mills for cement production.

Raymond Laboratory Separator for making test runs for any type of fine particle size materials.

ENGINEERING, Inc.

1321 North Branch Street, Chicago 22, Illinois

Sales Offices in Principal Cities



CONSTRUCTION AND ERECTION —UNIVERSAL ATLAS CEMENT PLANT UNIVERSAL, PA.

FOR PLANT DESIGN, ADDITIONS AND CONSTRUCTION

MACDONALD ENGINEERING CO.

TORONTO, ONT. CANADA

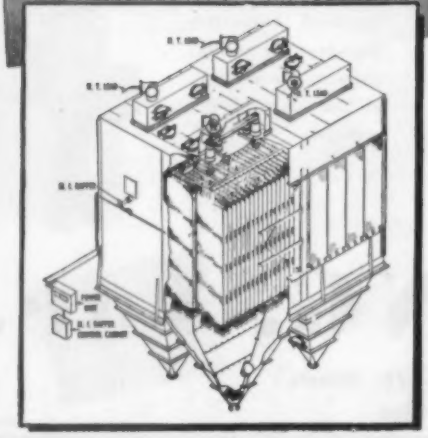
188 W. RANDOLPH ST. CHICAGO, ILL.

SAN FRANCISCO CALIFORNIA

NEW!

COTTRELL M-I RAPPER

ELIMINATES ALL FOUR...



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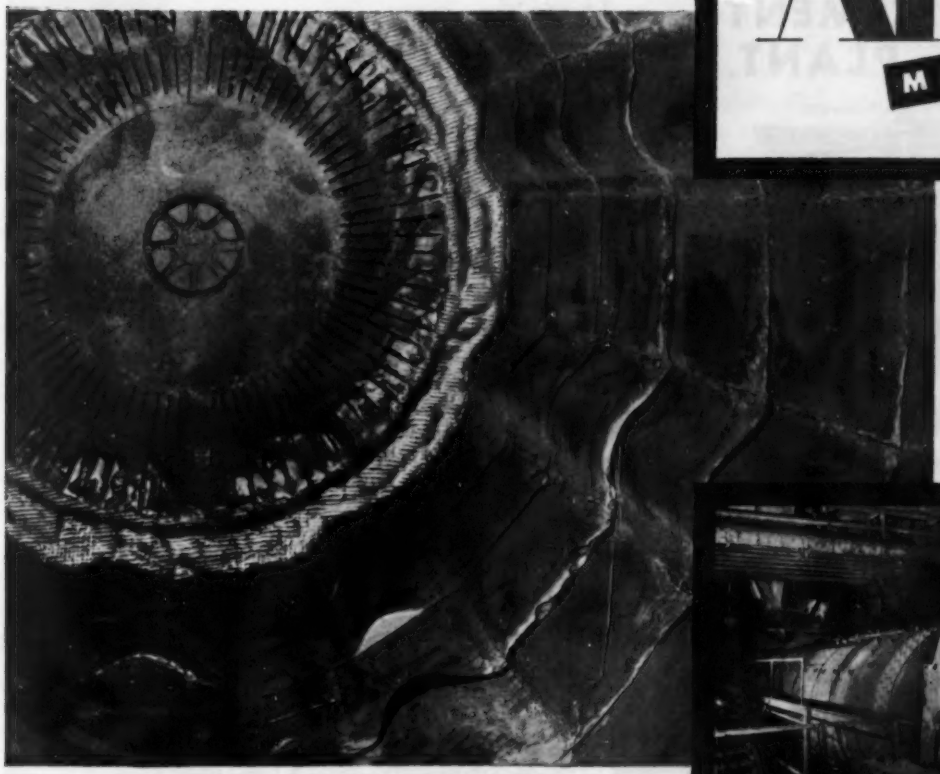
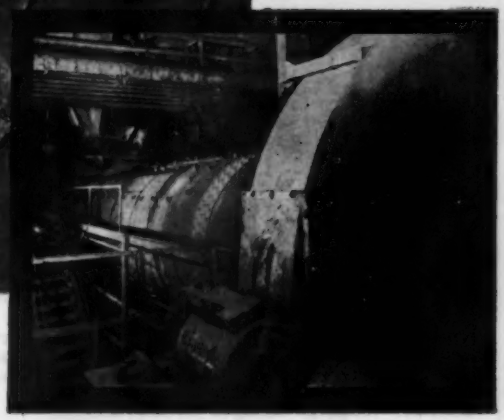


Interior of Standard Portland Cement ball mill. Note good condition of liners after 6 years service.



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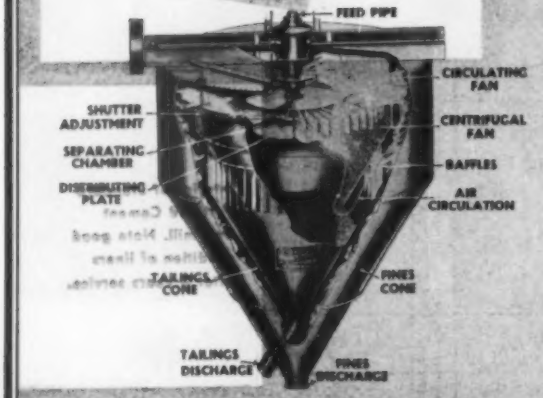

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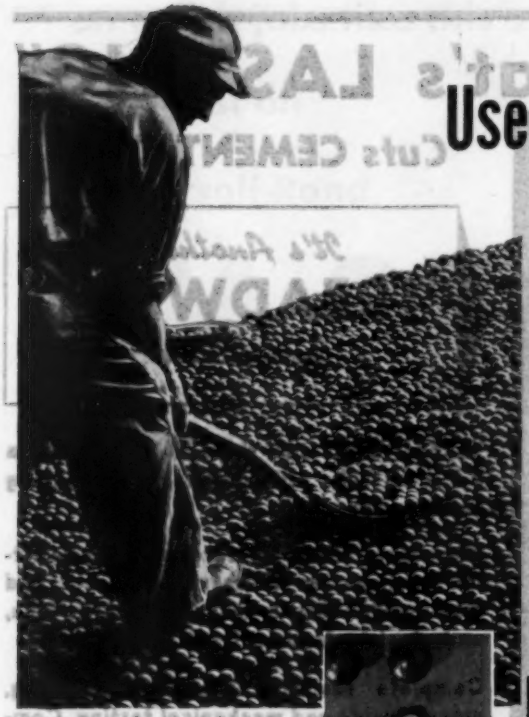

Above—Ni-Hard balls being packed in drums for shipment to cement plants from the Pennebacker Company.
Right—Pennebacker 1" diameter Ni-Hard balls sectioned to show soundness.

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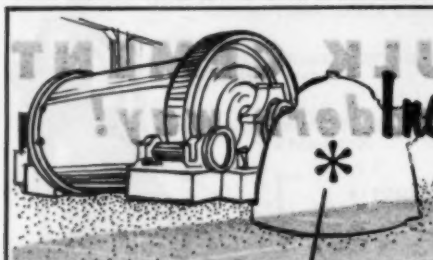

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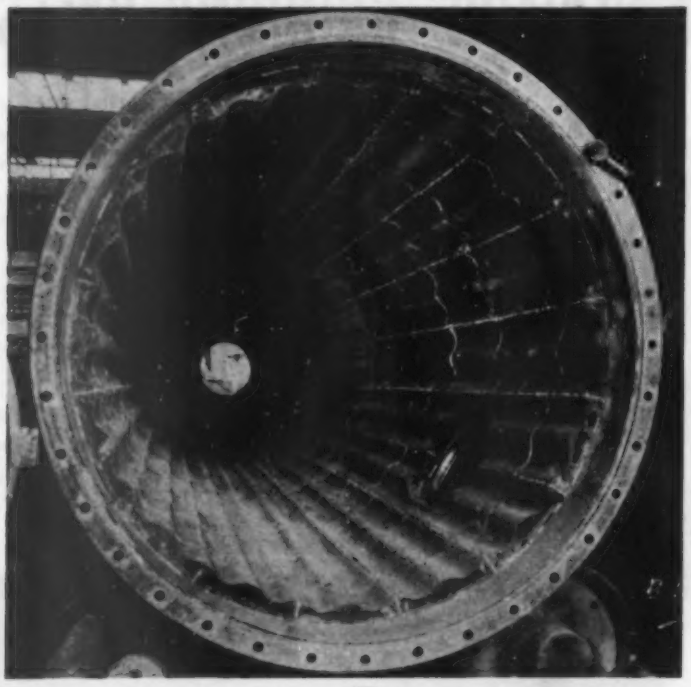
Cuts CEMENT Costs



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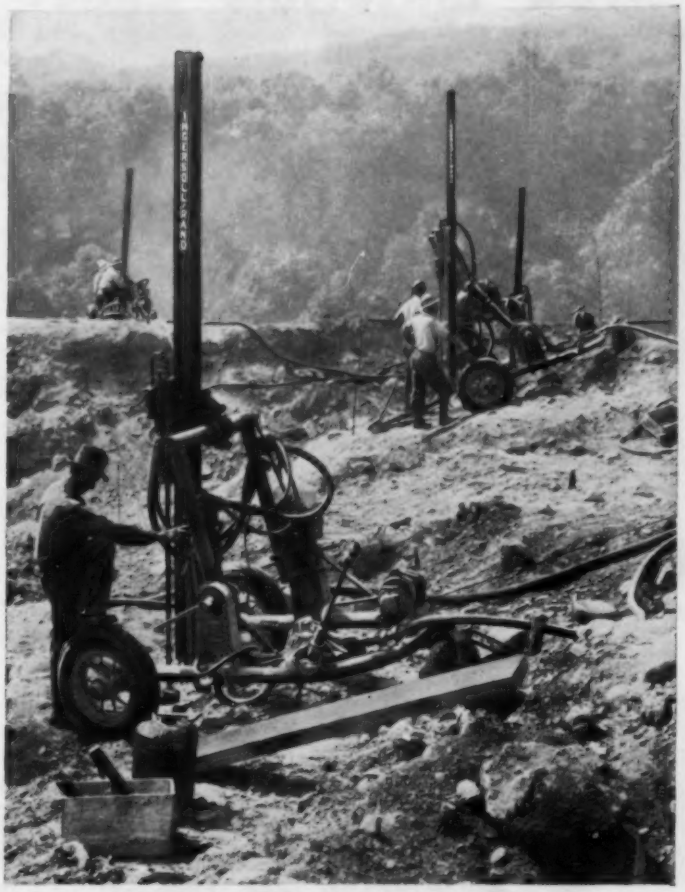

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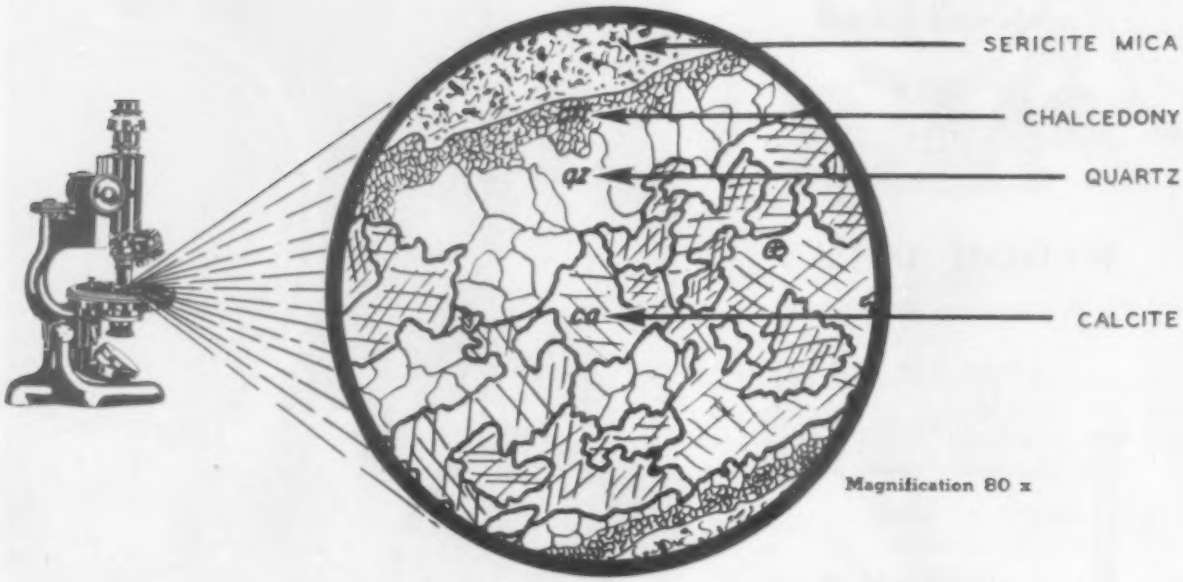

Your $CaCo_3$ may be too low.

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Your SiO_2 may be too high.

Are your raw materials in proper balance for the manufacture of all types of cement?

Are your "added materials" an important item of your operating costs?

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All types of cement can be manufactured from the same quality stone.

Low-grade limestone areas, near the market, heretofore not considered usable for cement manufacture, can now be utilized

The flotation rejects are often marketed as a by-product

In many instances, the saving in quarry operation alone, more than offsets the operating cost of flotation.

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S-10

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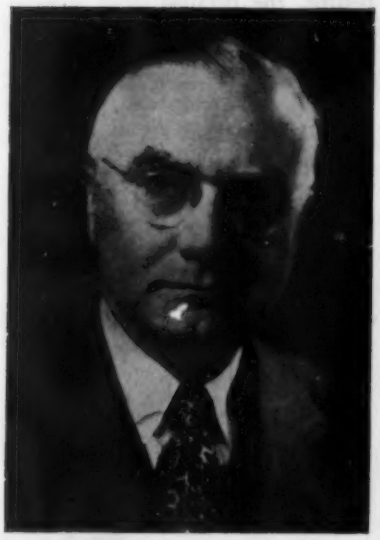
CLARENCE R. WOLF ELECTED PRESIDENT AT 19th ANNUAL MEETING OF N. I. S. A.



Stanton Walker, director of engineering, National Industrial Sand Association.

THE National Industrial Sand Association held its 19th annual meeting during the latter part of April. Featured were interesting and informative sessions dealing with such important industry matters as labor relations, percentage depletion, traffic, engineering problems, health, and insurance. One innovation of the three-day affair was the holding of separate meetings of the association's four standing committees on health, labor, percentage depletion, and the fineness and grading of foundry sands. A major highlight of the meeting was the forming of a special committee to explore the possibilities of conducting research on the use of silica flour as compared with fly ash in autoclaved concrete products.

Clarence R. Wolf (New Jersey Silica Sand Co., Millville, N. J.) was elected president of the association for the coming year. He succeeds Cortner M. Hardy, former president, who passed away last December. Emery M. Durstine (Keener Sand & Clay Co., Columbus, Ohio) was elected vice-president and William J. Cannon (Nugent Sand Co., Muskegon, Mich.) treasurer. Re-elected to the board for another year were Nanko C. Bos, Harte Campbell, and P. G. Forman. William D. Chadwick, Arthur F. Harrison, and Arthur B. Schlesinger were elected to the board for the first time for one-year terms.

In his *Report on Matters Relating to Workmen's Compensation,* Theodore C. Waters, N.I.S.A. counsel, covered in detail three main topics, including legislative developments during 1954, insurance rates applicable to the industry and the importance of code classification,, and the increasing importance of compensation for impairment of hearing. He reported a growing trend among state legislatures to increase benefits materially under the Workmen's Compensation Law. Presently labor is advocating the removal of fixed ceilings on weekly benefits for a fixed percentage (generally two-thirds of the average weekly wage at the time of the injury). This, of course, will mean increased costs to the producer.

In discussing the legislation in various states, Mr. Waters pointed out that a most significant development has occurred in New York, which increases benefits to widows of employees killed during the course of employment from $35 to a maximum of $40 per week, and for injured employees from $32 to $36 per week. New York State generally sets the pace for other states, he added. In Virginia the benefits under the law have been increased from $25 to $27 per week.

Mr. Waters next reported that in the following states legislation is now pending and has not as yet been effected: Kentucky, Massachusetts, Michigan, Mississippi, New Jersey, and Rhode Island. The Kentucky bill proposes new benefits from death and disability resulting from occupational diseases. The bill in Massachusetts proposes the creation of a monopolistic state fund and includes a number of drastic changes relating to appellate procedure. The Michigan bill proposes an increase of benefits. Another bill is pending which would provide a monopolistic state fund with the privilege of self-insurance. In Mississippi there is pending a law that proposes to repeal the Workmen's Compensation Act, reverting to common law procedure.

In New Jersey bills are pending that propose substantial increases in benefits and changes in administration. In Rhode Island the legislation would increase benefits and provide changes in appellate procedures transferring the disputes to the courts instead of the Industrial Commission.

Vincent P. Ahearn, executive secretary, National Industrial Sand Association.

In discussing insurance rates and code classifications, Mr. Waters reported that recently there have been instances in which employees of some companies have been arbitrarily assigned to a classification in which a higher rate is applicable without regard to a detailed investigation of the specific work and duties of the employees so reassigned. This has been true of some of the New Jersey company employees, who have been arbitrarily assigned to Classification No. 1741 (silica grinding) and removed from Classification No. 4000 (sand and gravel digging), such classification (1741) bearing a substantially higher premium charge. Companies in other states have had similar experience in the reclassification of their employees by transfer to classifications in which the premium rates are higher, he added.

Mr. Waters urged producers to review their entire portfolios of insurance and insist that insurance carriers adjust their policies and rates in those instances where it is justified. He said that until the producer tabulates his own information with respect to the particular types of policies which he carries, he will not be in a position to show the need for more favorable consideration in the assignment of his rates.

The speaker concluded by discussing the problem of noise in industry

and impairment of hearing resulting from exposure to excessive noise; he pointed out this subject has recently received extensive publicity in many of the industrial states. Because of its importance, he suggested that if excessive noise prevails in his plant, the producer should consider methods to control this noise or to protect employees therefrom and to establish methods for the purpose of defending this type of compensation claim.

Following Mr. Waters' talk the membership agreed that the code classification problem confronted by the industrial sand industry in New Jersey had elements of industry-wide concern and should therefore be handled as an association problem.

Stanton Walker, consulting engineer for the association, led a discussion of engineering problems. He referred to the discussion of foundry sand grading which had taken place at the White Sulphur Springs meeting and which had to do principally with the question of the desirability and the feasibility of expressing grain distribution in terms of "number of sieves."

Mr. Walker also made brief mention of such problems as the following: abrasive sands *versus* slag grits; the likely desirability of revising the *Manual on Abrasive Blasting;* packaging silica flour; and packaging machines and parts of special hardness for such machines. Some mention was made of the use of silica flour in the concrete field; this led to a discussion of potential competition from fly ash, particularly in the case of concrete products cured under high-pressure steam.

As a result of discussion of the use of silica flour in concrete, a special committee consisting of Arthur Schlesinger (Chairman), George Thornton, and Arthur Harrison was formed to explore the possibilities of doing some research on the use of silica flour as compared with fly ash in autoclaved concrete products.

On the second day of the meeting, there were separate meetings of the four standing committees of the association: the advisory committee on health; the advisory committee on labor; the committee on percentage depletion; and the committee on fineness and grading of foundry sands. The meetings were informal, and attendance was not limited to members of the committees. Because of its popularity, this practice will be continued in the future.

At the concluding session the various committee chairmen reported on their meetings the previous day. Earle T. Andrews, chairman of the advisory committee on health, offered a recommendation that the association arrange with the Industrial Hygiene Foundation of America for a dust study of the plants of those member companies which are interested in such a study project. The association conducted a similar study several years ago, and there were favorable comments on the worthwhileness of that study. The Foundation will make a general report to the association without disclosing the identity of any of the particular plants which are studied; this general report will be discussed at a future membership meeting.

On the subject of pre-employment examination forms, it was agreed that the association should collect the pre-employment examination forms now in use by members and, on the basis of existing practice, recommend to members generally a procedure for pre-employment examinations. It was also suggested that the advisory committee should undertake the development of a health manual for employees of industrial sand plants.

Ralph Lebold reported for the advisory committee on labor. Approval was expressed of the association's semi-annual report on rates of pay, hours of work, and conditions of employment. The committee regarded the association's work in the labor field as important in keeping the members accurately and reliably informed not only on general conditions of employment in the industry but also on federal legislation which affected employer-employee relationships.

W. D. Chadwick, newly-elected chairman of the committee on fineness and grading, reviewed the function of the committee, pointing out that it had been organized primarily to present the industry's point of view on various recommendations which might come before the A.F.S. Committee on Grading, Fineness and Distribution. He referred to the two recent meetings of the A.F.S. Committee, one held in Washington and the other in Chicago. At the first meeting it was tentatively decided that the "number-of-screens" designation ("two-screen sand," "three-screen sand," etc.) is not sufficiently definitive as to deserve a precise measure of grading distribution. It was therefore recommended, for the purpose of uniformity in nomenclature, that at least 10 percent should be retained between two adjacent A.F.S. standard sieves to have that size considered a "screen;" further that the determination of number-of-screens shall be made on the grain only expressed as 100 percent. It was recommended that if more accuracy or a better understanding of the sand is desired, the detailed sieve analyses be considered.

At the Chicago meeting, Mr. Chadwick went on, it was proposed that the description and paragraph submitted at the Washington meeting was too crude to be generally accepted by those members of the committee present. It was stated that screen analysis is best to use and all other descriptions are secondary. It was therefore felt best to have more individual papers on the subject before binding this committee with a definition. It was suggested that a general paper on this subject be presented at the next annual meeting; and therefore all members are to come to the next meeting prepared to announce their firm opinions on this subject, so that a paper can be prepared by the committee.

A. Y. Gregory reported for the committee on percentage depletion. Clarification was made of certain problems of application of the percentage depletion principle, particularly to that part of the report of the Ways and Means Committee to the House of Representatives on the new tax bill which stated that the 15 percent category is intended to include quartz sands or pebbles "when sold for their silica content." Mr. Gregory also discussed the special meeting of his committee which had been held in Washington on April 2. At the time of the annual meeting it was not known what action the Senate will take on this new percentage depletion proposal.

Following the committee reports, W. W. Collin, association traffic counsel, discussed the status of the consultations between the association and the United States Potters Association for revision of the ground sand rate structure. Another traffic question discussed concerned the proper classification for bonded sand and sand daub. The meeting was concluded with an interesting discussion of the business outlook for 1954, followed by the election of officers and a review of the Washington scene by Vincent P. Ahearn, N.I.S.A. executive secretary.

The association decided to hold its fall (1954) meeting at the Hotel Plaza, New York City, on October 20, 21 and 22. The annual meeting in the spring of 1955 will be held at the Homestead, Hot Springs, Va., on May 11, 12 and 13.

Perlite Institute Re-elects Lloyd President at 5th Annual Meeting

● Board of Directors of the Perlite Institute was unchanged as a result of election held at the annual meeting in Phoenix, Ariz. Seated left to right are J. C. Kingsbury, vice-president, Illinois; Lewis Lloyd, president, Louisiana; J. J. Brouk, past-president, Missouri. Standing: B. S. Howell Jr., Tennessee; K. J. Bercaw, California; K. E. Hazelton, Ohio; and Neal D. Snyder, Utah. T. C. Ward Jr., also a director, is not shown here.

THE Perlite Institute celebrated its fifth anniversary by becoming international in scope at its annual spring meeting held at the Camelback Inn near Phoenix, Ariz. For the first time, perlite producers from England and Australia joined with representatives from 27 United States perlite mining and processing companies for the three-day convention.

Lewis Lloyd, president of Alatex Construction Service, New Orleans, was unanimously re-elected president of the institute for another two-year term. Also unanimously re-elected to the board of directors were T. C. Ward Jr., Perlite Manufacturing Company, Carnegie, Pa., and B. S. Howell Jr., Tennessee Products and Chemical Corp., Nashville.

Reports by various technical committees showed that for the coming year the institute's activities will continue to be aimed at developing markets for perlite in the construction industry, with special emphasis on the promotion of perlite concrete roof decks and "certified" aggregate for plaster.

Two new research projects for developing information on perlite insulating concrete were announced by the Concrete Committee, both of which were to be completed by the end of June. One project was a study of vapor diffusion and moisture migration through insulating perlite concrete used in built-up roof decks. The study, conducted in co-operation with Granco Steel Products Company of Granite City, Ill., was undertaken to answer questions raised by roofing applicators regarding the behavior of perlite concrete insulation applied over metal decking.

Data developed in the study is summarized in a 43-page report prepared by Professor C. E. Lund, Mechanical Engineering Department, University of Minnesota. Entitled *Vapor Diffusion and Moisture Migration through Insulating Perlite Concrete Used in Built-up Roof Decks,* the report is available from members of the Perlite Institute, or it can be purchased from the Perlite Institute office in New York for $1. The report concludes that steel decks having normal end- and side-lap joint openings act as a controlled vapor barrier under the perlite concrete. Thus the properly installed steel deck does not permit an excessive amount of vapor to enter the deck, yet perlite concrete over steel decks having normal joint openings has sufficient permeance to permit release of air and vapor pressures generated under different conditions of exposure and therefore eliminates the possibilities of roof blisters.

The second research project to be undertaken is a fire test of perlite insulating concrete placed over metal roof decking and covered with a conventional built-up roof. The test, designed to simulate the type of fire which destroyed the General Motors transmission plant at Livonia, Mich., in 1953, is expected to demonstrate the fire safety of perlite concrete insulation in comparison to other types of insulation.

Three ways in which the Perlite Institute is helping to increase the market for perlite in the plastering industry were cited by R. L. Davis, secretary-treasurer of the Institute, in his annual report. This work includes the production and distribution of a movie describing firesafe perlite plaster construction, the development of a nationally recognized certification program to guarantee the quality of perlite plaster aggregate, and financial contribution to a national campaign to promote lath and plaster construction in co-operation with the National Bureau for Lathing and Plastering and other manufacturers of plastering materials.

One of the highlights of the meeting was the premiere of the Perlite Institute's new 26-minute sound-color film entitled *Lightweight Construction with Perlite.* The 16mm. movie shows the development of perlite from fiery volcano to fireproof construction, and is available through Perlite Institute members.

Several manufacturers commented on the effectiveness of the institute's certification program for raising quality standards of plaster aggregates. It was pointed out that the perlite Certification Seal, which guarantees that the plaster aggregate is manufactured to meet A.S.T.M. specifications, ties in very closely with the plastering industry's new national Seal of Certified Craftsmanship sponsored by the National Bureau of Lathing and Plastering.

"By offering these twin guarantees of certified perlite aggregate and certified craftsmanship, plastering contractors now have powerful sales tools to win the confidence of architects and encourage them to specify firesafe perlite plaster construction," said President Lewis Lloyd.

Three perlite manufacturers were also elected to membership in the institute, bringing the membership to a total of 49 companies—46 in the United States and Canada, and one each in Mexico, Australia, and England. The next annual meeting of the institute will be held in Washington, D. C. according to present plans.

WASHINGTON NEWS LETTER

Construction Sustains Economy

In his first press conference since he came to Washington over 18 months ago, Arthur F. Burns, head of the President's Council of Economic Advisers, expressed his optimism about the economic outlook as follows: "The thing that I find especially encouraging in the economic situation is that such objective records as we have of future business indicates an early upturn in economic activity."

He based this conclusion on two principal factors:

1. "A fair number of manufacturing firms in the country have revised their plans for plant and equipment expenditures in an upward direction."
2. "Construction contracts have been running at a very much higher rate than a year ago."

Actually both factors rely heavily on construction, which is by far the brightest spot in the current economic picture. While manufacturing, mining, the railroads, retail trade and many of the service industries have been falling behind last year's record in the first half of 1954, construction stands out as the largest industry which is surpassing its 1953 record—at least dollarwise.

Not only is total spending for current construction above last year's level, but, even more important, contracts for new construction continue to rise. In his interview, Dr. Burns called special attention to this fact in the following words: "In January construction contracts were up something like 7 percent in comparison with January of 1953. In February the increase was something like 20 percent; in March something like 13 percent; in April, due to a decline in the public sector, there was an overall decline of some 2 or 3 percent; and in the month of May, judging from the base statement of the first three weeks through May 22, the increase is 35 percent."

The important point about this rise in construction contracts is that it is a virtual guarantee of future construction activity. Public works and industrial building contracts generally take 18 months or longer to complete; commercial projects will often take 6 to 8 months; houses usually take 3 to 4 months.

Moreover, construction is one of the few areas in which a substantial need is still perfectly obvious. While the automobile industry is considering how close it has come to saturating the market so that it will be left with only a replacement demand, the construction industry can be confident that the need for more schools, hospitals, roads, offices, and houses is far from filled. Indeed, with our rapidly increasing population and their almost insatiable desire for the "better things of life", there is a great question as to whether these needs can ever be fully met.

After commenting on the vital role of construction, Dr. Burns pointed to additional good signs as follows:

"So far as plant and equipment expenditures are concerned, I would expect some increase in that as well, certainly no significant decline.

"As far as inventory investment is concerned, I think we have reached a stage where inventories, by and large, which have been causing us so much trouble, will begin working in our favor . . .

"Now, I think we have reached a stage in the inventory readjustment where the rate of decline of inventories has diminished, so that the change in the inventory picture will tend to lift the current volume of production.

" . . . Turning next to consumers markets, there are signs, I think, of some recovery in sales to consumers . . .

" . . . As for governmental spending, I hesitate to make any forecast, and I certainly do not intend to make one.

"I would merely say this: that in view, first, of the decline that has already taken place in military spending this year (in fact, since the middle of last year) and, second, in view of the current state of our international affairs, I am inclined to think that governmental spending will remain—government spending as a whole and military spending in particular—at a very high level."

Military Spending—the Big Question

Dr. Burns later stated specifically that he was not predicating his hopes on a change in planned defense spending. Nevertheless, it is clear from his previous remarks that the decline in military spending is over and that a reversal of that trend is probably expected.

Should that happen, there is little doubt that business will be further stimulated. Actually, the threat of inflation would become very serious again.

Even without the unhappy developments in Southeast Asia, military spending was due to be stepped up.

For the last year there has been a substantial slowdown in defense procurement resulting primarily from the change-over to the Eisenhower "new look" program. For the year ended June 30, 1952, nearly 29 billion dollars worth of material was ordered; for the year ended June 30, 1953, the amount was 19 billion dollars. However, for the year ended June 30, 1954, the amount was less than 3 billion dollars, a tremendous decline that could not fail to be felt far and wide throughout industry.

This is not to say that only 3 billion dollars' worth of goods was produced. Much more was produced to fill old orders. New orders, however, which form the real incentive, fell away to very little.

Now that the defense program has been reorganized, and with the impetus of the critical economic situation, Washington is ready to begin spending again. There is about 12 billion dollars on hand right now, and there are requests before Congress that can bring the total funds available up to about 40 billion dollars.

It is hard to tell just when the flow of new orders will begin. It would be no surprise at all if this trend were to begin soon enough to have an effect on the November elections.

The Steva Stone Company, Richmond, Mo., was recently awarded a contract for $171,000 for 1,000 tons of crushed rock by the Clay County court. One and one-fourth miles of road extending east from the Arley community will be resurfaced with the crushed rock.

A fire causing damage estimated at $30,000 destroyed a large equipment building at the Flack and Henderson Sand and Gravel Company in Lyons, Wis., and gutted an attached three-apartment building occupied by the owners. Faulty wiring was thought to have caused the fire.

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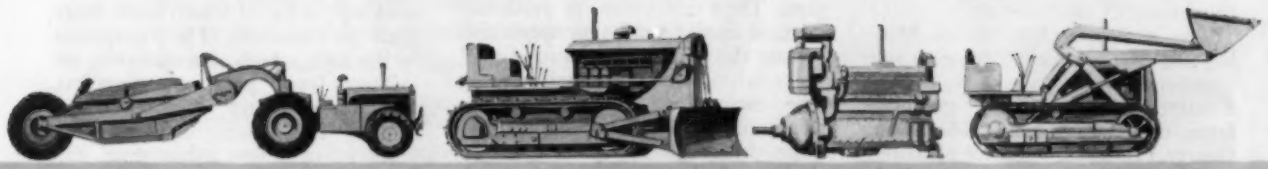

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Canadian Institute of Mining and Metallurgy Meets in Montreal

REFLECTING the steady growth of Canada's mineral industry, the 56th annual general meeting of the Canadian Institute of Mining and Metallurgy held in the Sheraton-Mount Royal Hotel, Montreal, April 26, 27, and 28 was the largest in the history of the Institute. Nearly 1,600 delegates were in attendance, including many from the United States and other countries.

President A. E. Flynn of Halifax presided over the main sessions. C. C. Huston of Toronto, a mining consultant, was elected president at the conclusion of the meeting.

The American Institute of Mining and Metallurgical Engineers was represented by its president, Leo F. Reinartz, who brought greetings from the sister society. The Hon. George Prudham, Minister of Mines and Technical Surveys in the Federal Government, and James Muir, president, Royal Bank of Canada, and other leaders in the commercial and industrial life of Canada addressed the delegates.

In addition to being the largest gathering in the history of the Institute, the meeting made history in approving a resolution to admit to full membership women who possess the necessary scientific and technical qualifications. This resolution will now be presented in the form of a letter ballot to all members.

Approximately 60 papers were read before the six technical divisions. They ranged in subject matter from the problems of the coal industry to the cause and prevention of efflorescence on masonry buildings. A brief summary of the papers dealing with industrial minerals follows.

Application of the Freezing Method to Shaft Sinking at the Ojibway Mine of the Canadian Rock Salt Co. Limited was the title of a paper by Charles P. Gail, project manager for Winston Bros. Company, Minneapolis, Minn. This paper described how unstable ground and water-bearing strata were being frozen in order to sink the shaft through them. The shaft is to give access to what will be Canada's second rock salt mine. It is 16 ft. I.D. and is being sunk to a depth of 1,100 ft. The concrete lining ranges in thickness from 16 in. at the top to possibly 30 in. in the wet zone at a depth of 750 ft. Below this depth the lining will be 12 in. thick.

In sinking the shaft a series of vertical holes is drilled on the circumference of a circle outside of the shaft lining and concentric with the shaft. The holes are drilled to a depth slightly below the greatest depth at which water-bearing strata occur. Freeze pipes are placed in each hole and are connected to manifolds which are connected to the refrigeration plant.

As the freezing goes on, a cylinder of ice is formed around each freeze pipe. These ice cylinders gradually increase in size until they meet and enclose the shaft area in a solid wall of ice, within which the shaft is sunk. The excavation is carried on in stages of 21 to 28 ft. After each stage the forms are placed in the shaft, and the concrete is poured. Shaft facilities such as pipes, ladders, and platforms are installed as the shaft advances. After the shaft is complete to below the water-bearing strata, grouting is done back of the lining, and the ground is allowed to thaw. The paper outlined the problems that were encountered and the methods of overcoming them.

In a paper entitled, *Efflorescence, Some Causes and Preventions,* W. Graham of the Mines Branch, Department of Mines and Technical Surveys, Ottawa, presented data on this bane of the construction industry. He described the various types of efflorescence and how they could be removed and also gave his findings as to the causes and how to prevent the phenomenon. His conclusions were that ceramic units such as brick and tile only contributed to a minor extent to efflorescence, and the main cause is to be found in the mortars, composed of lime and portland cement. The technique used in his investigation was outlined; and he concluded with the statement that calcium chloride in the proportion of approximately 4 percent by weight of portland cement added to the mortar would be sufficient to prevent efflorescence. A bibliography of literature on the subject was included.

A. Andersen, production manager, Black Donald Graphite Division, Frobisher Limited, in his paper *Black Donald 1942-53* gave a resumé of the final operations at a famous old mine which has been the only truly successful Canadian graphite producer. The mine is near the village of Calabogie, Ont., 80 miles west of Ottawa and is partly under Whitefish Lake. Since it is now worked out, the mine has been closed; it is now flooded.

In 1942, at the request of the Canadian Wartime Metals Control Board, Frobisher Limited undertook an examination of the property and acquired title to it in the following year. The mining operation involved the re-opening of flooded, uncharted workings, some of which were more than 50 years old. The equipment in the mill, which was operating on tailings from previous operation, was renewed and production was stepped up. During the final ten years of operation more than 45,000,000 lb. of finished products were sold. At the time of closing 40 different graphite products were being marketed. Froth flotation was the process employed to separate the graphite from the gangue.

Differential Thermal Analysis by G. A. Collins and A. G. Swan, Research Council of Alberta, was a paper designed to show the application of that technique to the rapid identification of industrial minerals. The differential thermal analysis equipment used at the Research Council of Alberta was described, and the application of the method was illustrated by the results of studies of carbonates and sulphides.

One session of the Industrial Minerals Division consisted of a symposium on the ore dressing of industrial minerals. It included papers on grinding, air classification, and magnetic separation equipment. The introductory paper was by Bertrand Robinson, Canadian district manager of Hardinge Company Inc., Toronto. He dealt briefly with the various basic types of equipment used in dry grinding and in classification in his paper, entitled *Dry Grinding and Air Classification Equipment.*

R. J. Haskin of Dings Magnetic Separator Co. discussed *Magnetic Beneficiation of Nonmetallic Minerals.* He pointed out that magnetic separators, although widely used on

(*Continued on page* 168)

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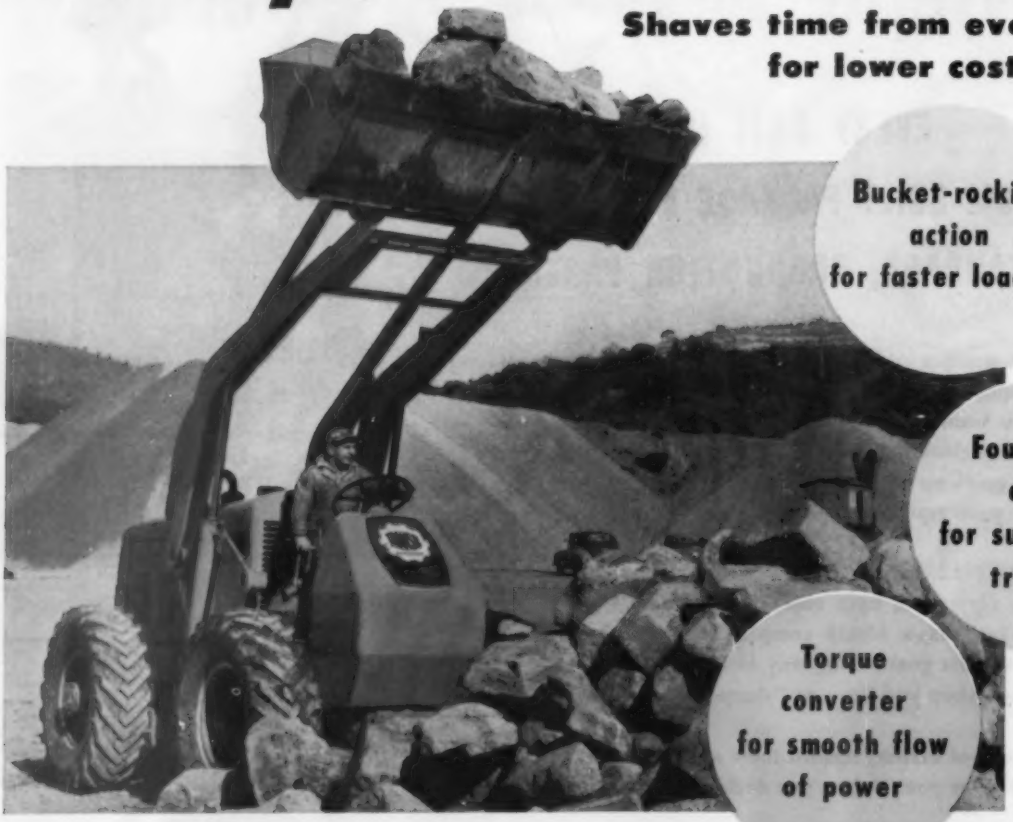
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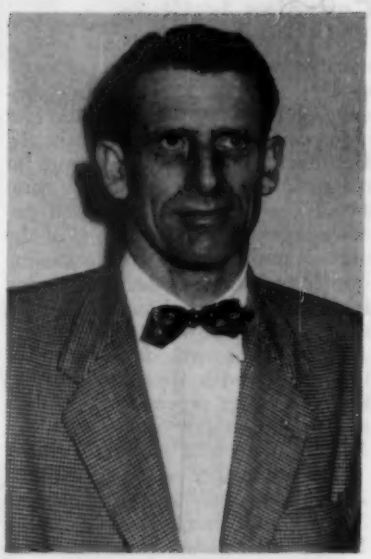
Northwest A. I. M. E. Conference Presents Varied Program

THE 1954 Pacific Northwest metals and minerals conference of the American Institute of Mining and Metallurgical Engineers was held at Portland, Oreg., on April 29 and 30 and May 1. Members attending were given an opportunity to join plant tours on the first day; on the remaining two days technical sessions were held. Originally organized as an industrial minerals conference, the meeting, which rotates annually among Spokane, Seattle, and Portland, now includes iron and steel, physical and extractive metallurgy, and geology sections. The mineral industries education symposium on Thursday evening, with Dr. Ira S. Allison as moderator, elicited much information for the numerous students present. The ground-water symposium, the filtration of industrial gas symposium, and the 38 individual papers were presented during the remaining sessions. All were well attended, some had s.r.o.

Thomas J. Waters, manager of Pacific Carbide & Alloys Company, Portland, gave an information-packed paper on the production and marketing of agricultural limestone in the Pacific Northwest. Only 50,000 tons of agstone were spread in Oregon in 1953 despite estimates by agricultural authorities that the state needs an annual application of 500,000 tons. Heavy rainfall in the narrow strip west of the Cascades in Oregon and Washington depletes the lime in the soils rapidly. Most of the agstone used in the area must come from considerable distances, ranging up to 360 miles. In Oregon and Washington lime, to be eligible for federal subsidy, had to be 90 percent minus 10-mesh and 20 percent minus 100-mesh. This year a scoring method has been adopted in Oregon. The tabulation below contains the essential features of the new fertilizer law. (Figures shown illustrate the method of calculation.) Cost of limestone to the farmer in Oregon and Washington is generally in the range of $10.50 to $11 per ton.

An excellent paper, *Moving Industrial Minerals to Market,* was read by John M. Poorman, vice-president, Kenneth Poorman Company, Portland. Mr. Poorman emphasized the point that transportation is a perishable commodity. He pointed out that producers and shippers should re-examine their materials-handling methods at frequent intervals.



Leslie C. Richards, chairman of the Industrial Minerals Division of the 1954 conference.

The first public account of the Great Lakes Carbon Company's Terrebonne diatomite operation was given by D. F. Dyrsmid, chief engineer, Dicalite and Perlite Divisions.

Screen size	Percent in Each Particle Size Separation	Availability within 3 Years (Percent)	Fineness Factor
50-mesh or smaller (% passing 50-mesh)	80	100	80.0
10- to 50-mesh (% passing 10-mesh less % passing 50-mesh)	18	40	7.2
10-mesh or larger (100% less % passing 10-mesh)	8	0	0
			Total 87.2
Calcium carbonate equivalent			92
Available calcium carbonate equivalent			Score 80.2

Participating in one of the sessions of the Industrial Minerals Division were G. Donald Emigh, Monsanto Chemical Co.; James McDivitt (co-chairman), University of Idaho; Dr. Vernon E. Scheid, University of Nevada; Harry W. Marsh (co-chairman), Idaho Mining Association; Donald L. Masson, Washington State College; and D. F. Dyrsmid, Dicalite and Perlite Divisions, Great Lake Carbon Corporation.

In addition to the Terrebonne operation, the company controls deposits in Otis Basin in northeastern Harney County, Oreg., at Lompoc and Walteria, Calif., and at Basalt, Nev.

Other papers of particular interest included the following: *Exploration and Mining of Phosphate Ore Near Soda Springs, Idaho,* by G. Donald Emigh, Monsanto Chemical Co.; *Kyanite Resources of the Pacific Northwest,* by Donald L. Masson, chairman, department of mining, Washington State College; and *Trends in Industrial Mineral Development in Idaho,* by James McDivitt, University of Idaho. At one of the sessions a 30-minute film entitled *Cement, The Stone of Ages,* released by the Permanente Cement Co., was shown.

Canadian Institute

(From page 164.)

metallic ores, were as yet not commonly used in beneficiating nonmetallic minerals but that they had important applications, nevertheless. He described the various types of magnetic separators available and pointed out the advantages and disadvantages of each. Examples of the use of the separators in removing iron from borax, crushed quartz and feldspar, crushed limestone, silica sand, and barite, were cited.

Costs of magnetic separators naturally vary with the nature of the material being processed, but operating expenses average out to about 4 cents per ton of material treated.

The next paper on the symposium, *Beneficiation of Some Canadian Nonmetallic Ores*, by H. L. Beer, Industrial Minerals Division, Mines Branch, Ottawa, gave a summary of the flotation tests made in the Mines Branch on such industrial minerals as apatite, fluorspar, limestone, kyanite, and spodumene. A brief description of work done on separating bitumen from Alberta bituminous sands was also included.

The final paper of the symposium, *Flotation of Nonmetallics* by Clarence Thom and H. J. Gisler of the Denver Equipment Company, was presented by A. D. W. Medlock of the same company. The various problems peculiar to nonmetallic minerals were discussed, such as are presented by the low value per ton of many of these minerals, and by the occurrence together of two or more basic minerals such as barite, fluorite, apatite, calcite, and dolomite with acidic minerals such as feldspar, quartz, and mica. The presence of clay minerals also reduces the effectiveness of most combinations of reagents and in many cases inhibits flotation. Commercial specifications of the more important industrial mineral products were given, and numerous flow sheets of typical milling plants were presented as illustrations of how these various problems were overcome.

At the business session of the Industrial Minerals Division, J. E. Gillespie, manager of the Caledonia plant of Gypsum Lime and Alabastine Canada Limited, was elected chairman for 1954-55, and D. F. Hewitt of the Ontario Department of Mines was elected secretary.

At the conclusion of the convention, tours were made to the mine and plants of Canadian Refractories Limited at Kilmar and Marelan, Quebec, and to the plant of Canadian Copper Refiners Limited at Montreal East.

Belgian Congo Cement Plants Increasing Annual Output

Production of cement in the Belgian Congo and Ruanda-Urundi shows a rising trend, the total output in 1952 having increased 17 percent over 1951. At Lukulu in Bas Congo the Cico plant reported an increase of 9 percent over the 1951 output.

Cimenkat, a venture in Lubudi, Katanga, produced a total of 126,330 tons of portland cement and 2,036 tons of "amaigri" (lower-quality) cement in 1952. (Fuel shortages and transportation trouble prevented the realization of the goal of 150,000 tons set for 1952.) Cimenkat shipped a total of 13,000 tons of clinker to Usumbura, Ruanda-Urundi, where it operates a grinding plant with an annual capacity of 20,000 tons, to supply the local market. Installation of a fifth rotary kiln was reported to have been completed late last year.

Construction of a 40,000-ton plant at Albertville was scheduled to be completed at the end of last year for Cimental; and the new installation of Ciments Metallurgiques de Jadotville at Katontwe was opened earlier. Additional cement plants may be constructed near Stanleyville and in the Kiva.

Gypsum Production Irregular In 4th Quarter and All of 1953

Domestic mine production of crude gypsum during the fourth quarter of 1953, as reported to the U. S. Bureau of Mines, was 2,051,369 short tons—1 percent more than in the fourth quarter of 1952. Imports were 3 percent higher than in the same period of 1952, and the apparent crude supply was 1 percent higher. Production of calcined gypsum was 4 percent higher than during the same quarter of 1952.

Fourth-quarter gains and losses among the gypsum products were irregular. Dental and orthopedic plasters, agricultural gypsum, Keene's cement, and prepared finishes showed the greatest declines, while sanded (including perlite-premixed) plasters, other building plasters (mainly roof-deck), and fillers and unclassified uncalcined materials showed the major increases. Moderate gains were registered by the prefabricated group.

Cumulative January - December products totals show the same irregularity for the entire year. Marked gains were shown for sanded plaster, other building plasters, plate-glass and terra-cotta plasters, fillers and unclassified uncalcined products, and sheathing board, while prepared finishes were off 17 percent and several other products were down as much as 9 percent.

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Market Development and Selling Stressed at Recent Lime Convention

N.L.A. meeting at Hot Springs, Va. covers wide range of subjects important to the industry

another ON THE SPOT report

THE keynote of the recent 52nd Annual Convention of the National Lime Association at Hot Springs, Va., was set by President Amos B. Miner in his welcoming address to the near-record attendance. He stressed the necessity for the industry to forget the recent scramble for

By WALTER E. TRAUFFER

more production, to relearn the art of merchandising and to concentrate on the development of new markets and of improved products for the present markets. The excellent program followed this pattern, with an outstanding salesman expounding on this subject, and with other experts telling about potential markets for lime in water pollution control, lime-fly ash stabilization, agriculture, electric steel furnaces, glass-making, autoclaved concrete products, etc.

Those attending also made full use of the unrivalled facilities of The Homestead, one of this country's outstanding resorts. Fortunately, these facilities are both indoors and outdoors as the weather was not up to its usual standard, ranging from very hot to near freezing, with considerable rain.

Officers and Directors Amos B. Miner (National Gypsum Co., Buffalo, N. Y.) was reelected president and chairman of the board of directors of the association. Others reelected were: Robert S. Boynton, general manager; Gladys L. McBee, secretary; Paul Sunderland (Ash Grove Lime & Portland Cement Co.), treasurer. Members of the executive committee are: Michael Brisch (Rockwell Lime Co., Manitowoc, Wis.); Reed C. Bye (Warner Co., Philadelphia, Pa.); Bolton L. Corson (G. & W. H. Corson, Inc., Plymouth Meeting, Pa.); Ralph L. Dickey (The Kelley Island Lime & Transport Co., Cleveland, O.); K. L. Hammond (Keystone Lime Works, Inc., Keystone, Ala.); C. C. Loomis (New England Lime Co., Adams, Mass.); Wallace E. Wing (Marblehead Lime Co., Chicago, Ill.).

Officers of the National Lime Association, left to right: Paul Sunderland, treasurer; Amos B. Miner, president; Robert S. Boynton, general manager; and Miss Gladys L. McBee, secretary.

Members of the board of directors are:

District 1—C. C. Loomis, New England Lime Co., Adams, Mass.

District 2—Bolton L. Corson, G. & W. H. Corson, Inc., Plymouth Meeting, Pa.; J. P. Feiser, LeGore Lime Co., Le Gore, Md.; E. D. Williams, H. E. Millard Lime & Stone Co., Annville, Pa.

District 3—Reed C. Bye, Warner Co., Philadelphia, Pa.; F. J. Collins, The Kelley Island Lime & Transport Co., Cleveland, O.; Amos B. Miner, National Gypsum Co., Buffalo, N. Y.

District 4—Helen McNamara, Eagle Rock Lime Co., Eagle Rock, Va.; Charles Hartman, Peery Lime Co., North Tazewell, Va.

District 5-A—Fred Witmer, The Ohio Hydrate & Supply Co., Woodville, O.

District 5-B—Charles A. Rarey, The Marble Cliff Quarries Co., Columbus, O.

District 6—L. N. Carmouche, The Dow Chemical Co., Ludington, Mich.

District 7—Robert F. Mathews, Mississippi Lime Co., Alton, Ill.; E. H. Siebrasse, Menke Stone & Lime

Three of the speakers, left to right: Frank Bentz, Jr., University of Maryland; John K. Selden; and Edward T. Misiascek, Clarkson College of Technology.

Left to right: Irving Crown (Marblehead Lime Co.); L. F. Warrick (U.S. Public Health Service); and Wallace E. Wing (Marblehead Lime Co.).

Left to right: C. C. Loomis (New England Lime Co.); Mrs. F. J. Collins; John M. Deely and Mrs. Deely (Lee Lime Corp.); F. J. Collins (Kelley Island Lime & Transport Co.); Mrs. C. C. Loomis; and John Gaisford (Lee Lime Corp.).

Co., Quincy, Ill.; Wallace E. Wing, Marblehead Lime Co., Chicago, Ill.

District 8—Michael Brisch, Rockwell Lime Co., Manitowoc, Wisc.

District 9—Paul LaLiberte, Cutler-Magner Co., Duluth, Minn.

District 10-11—M. A. Rikard, Southern Cement Co., Birmingham, Ala.; George L. Scott Jr., Alabaster Lime Co., Scotrock, Ala.

District 12—Paul Sunderland, Ash Grove Lime & Portland Cement Co., Kansas City, Mo.

District 13—George E. Robinson, Austin White Lime Co., Austin, Tex.

District 14—Adda M. McMillin, Roche Harbor Lime & Cement Co., Roche Harbor, Wash.

District 15—Kennedy Ellsworth, United States Lime Products Corp., Los Angeles, Calif.

Ex-officio directors (past Chairmen of the Board) are: Charles Warner, Warner Co., Philadelphia, Pa.; Henry LaLiberte, Cutler-Magner Co., Duluth, Minn.; K. L. Hammond, Keystone Lime Works, Inc., Keystone, Ala.; Wallace E. Wing, Marblehead Lime Co., Chicago, Ill., and Amos B. Miner, National Gypsum Co., Buffalo, N. Y.

President's Address Amos B. Miner, president and chairman of the board of the National Lime Association keynoted the meeting in his address of welcome. He emphasized that the Association is in the healthiest position in its history as to financial status, benefits and services afforded its membership, and that efforts are now supported by better than 80 percent of the country's open market lime tonnage, with affiliates in 17 foreign countries. Mr. Miner pointed out that this widespread interest is due almost entirely to a hard headed business appraisal of the benefits derived by membership, coupled with a mutual respect and understanding of the "other fellow."

The past ten years of materials shortage and need for increased production at any cost is the high price paid, said Mr. Miner, for the position in which the industry presently finds itself,—with the art of merchandising and the development of new markets practically forgotten in the mad scramble to keep abreast of the inflationary cycle of that period. He felt that the National Lime Association's policies had accomplished much in ameliorating the effects of these general economic mistakes for their industry, pointing specifically for illustration of this to substantial tax relief afforded chemical and metallurgical stone and to the vast research undertaken on the use of lime soil stabilization. He stated that over 10,000 tons had been so used over the past year for this purpose, emphasizing this quantity to be but a drop in the potential bucket of new and profitable markets for various lime products.

He decried any tendency toward despair in this era of capacity surpluses, declaring that the industry must learn to operate at less than 100 percent of capacity while making sufficient profit to attract capital for new and increased markets, emphasizing that this can best be done by cooperative effort. Outlining possible new markets, Mr. Miner cited President Eisenhower's interest in the correction of stream pollution with lime, discussed by the President at a recent meeting of the National Rivers and Harbors Conference. Such high level concern should eventually increase the use of lime, whether the high calcium or dolomitic, commercially produced or by-product material, as the major chemical. Mr. Miner said that if the present research of the steel industry proves lime economical for blast furnace injection, a market would be created for more lime than the industry could produce. As a possible additive to molten blast furnace slag for economically producing portland cement, vast tonnages would be required. New applications in the paper industry would add increased tonnage. Mr. Miner called on the membership for their combined efforts toward constructive research work on the above-named channels of new use.

In closing, he warned against the temptation to take recourse to the illegal practice of discrimination in

Left to right: Michael Brisch (Rockwell Lime Co.); John Dalglish (Dallock Corp.); Mrs. Burton A. Ford; John F. Gruber (St. Regis Sales Corp.); Mrs. E. D. Williams; Burton A. Ford (St. Regis Paper Co.); Mrs. W. H. Moores; E. D. Williams (H. E. Millard Lime & Stone Co.); Mrs. Michael Brisch; W. R. Huck; W. H. Moores (Moores Lime Co.); and Mrs. John F. Gruber.

solving merchandising problems, praised as beneficial the legislation of the Clayton and Robinson-Patman Acts, and urged that the industry endeavor to reduce their costs and thus contribute to the general good by increasing the purchasing power of the consumer dollar.

Boynton's Report In the introduction of his topic as to what the National Lime Association is accomplishing, Robert S. Boynton, general manager of N.L.A., reviewed the 1953 lime business as "rosy" at the start, reaching its lowest point of recent years as it declined last fall, and experiencing only a slight improvement this last winter. He felt that this improvement in demand would continue, however, due to new industrial users and expansions to existing lime consuming facilities, but not without co-lateral increase in member company sales programs. He said that 25 percent less salesmen are now selling twice as much lime as in pre-war times. He urged creative selling, such as promoting and developing new markets like road stabilization, acid neutralization, and concrete products field, citing the potent ammunition the National Lime Association affords its members for use in such sales programs.

On percentage depletion efforts, Mr. Boynton reassured the membership of continuing this program, to consolidate the position gained by the Association. If the House amendment now proposed goes into law, this should consolidate the position for high-grade limestone and its 15 percent allowance. He felt that the new 68-page road stabilization book produced entirely by the N.L.A. staff, and reviewed by experts, was the biggest single project of the year, and does a convincing sales job to the highway engineers.

Left to right: Mrs. Lester Crown; Wallace E. Wing (Marblehead Lime Co.); Mrs. Amos B. Miner; Lester Crown (Marblehead Lime Co.); Mrs. Paul Sunderland; Irving Crown (Marblehead Lime Co.; Mrs. Wallace E. Wing; Paul Sunderland (Ash Grove Lime & Portland Cement Co.); Mrs. Irving Crown; Mr. and Mrs. J. E. Kelley, Jr. and Amos B. Miner.

Progress was reported on safety accomplishments, the industry's first plant and quarry safety code, to be distributed within this year, being typical. All plant superintendents were urged to study and follow the safety ideas in *Limeographs,* toward practically improving any company's safety record.

The Research Fellowships started at two universities, covering certain aspects of lime-fly ash (or pozzolan) straight lime stabilization of fine and coarse soils, were expected to reveal interesting and favorable facts. The trade waste program at Purdue University on breaking petroleum (oil) emulsions with lime, produced most interesting and valuable results, but until the patent situation is properly protected, no formal report will be made. This could mean attractive new lime tonnage for the industry.

A lime manufacturing cost or performance survey has been tentatively approved, based on the interest at a record attendance at the Birmingham Operating Meeting last fall. This would permit a ready comparison of an individual plant's phases of production with the overall picture. This is to be finalized at the Milwaukee meeting next fall.

A.S.T.M. mortar specification C-270 has been revised, said Mr. Boynton, removing certain misleading mortar designations militating against lime. A 1:2:9 mortar—long used in the P.C.B.O.C.B.B.C., has now been authorized for other areas, and the use of lime in mortar for unit masonry has been liberalized on the West Coast. Sharp protests have been registered to the National Bureau of Standards and the Federal Specification Board on the unfairness to masons lime, in their proposed Federal Specification on Structural Lime. John Selden is preparing articles on lime additions to autoclaved concrete products, based on past association research at Toledo. The potentiality of lime in this field should prove of real value. Talks on lime in various of its uses, given by Mr. Boynton or Kent Jander before various groups, were listed as important

At this table are Mr. and Mrs. W. J. Cabaniss and Mr. and Mrs. M. A. Rikard (Southern Cement Co.); Mr. and Mrs. John V. Andrews and Mr. and Mrs. J. W. Rockwood (Kelley Island Lime & Transport Co.).

education features presented in 1953.

In his closing remarks, Mr. Boynton stressed the most important element of value in trade association functions—that of the development and maturing of new ideas by and for its members and the consuming public—and putting these ideas to use for greater productivity and an improved economic situation, by their free exchange among all those interested. He urged keeping up the momentum to this trend, by making the N.L.A. the prime merchant of ideas for the lime industry.

Accident Control Reduces Costs *Cost Reduction Via Accident Control* was the subject discussed by Ralph J. Crosby, of Marsh & McLennan, insurance brokers. He said that safety and accident prevention cannot be separated. Safety records in industry have improved but much further improvement is possible and necessary if insurance costs are to be held down. According to Mr. Crosby the trend of insurance costs has been upward due to the rising cost of living, the more liberal interpretation of insurance provisions, the added or increased benefits, etc. He pointed out as an example that in one state allowances for partial or permanent disability of older workers has shot way up as there are no retirement provisions available to them.

Mr. Crosby also said that in the past five years the average cost of a case has gone up much faster than the insurance rates. About 70 percent of the premium payment now goes to medical and other costs. Insurance rates are based on losses so the best way to reduce costs is to reduce accidents. There is, he said, little actual information available on the cost of accidents but studies have shown that plants with dropping accident rates have 11 times the chance of succeeding as those with increasing rates.

Good business and safety go hand in hand and when efficiency is improved so is safety. Mr. Crosby said that a studied accident program can show up many ways in which things can be done more efficiently and economically. Most workers do not realize what an accident costs them and much can be done by pointing this out to them. Fatigue of workers is also a major reason for accidents, he said, and is usually due to some undesirable factor such as noise or poor lighting. Mr. Crosby concluded by stating that if management will develop an intelligent and complete safety program and follow it through with studies of how accidents happened and how they can be prevented it is bound to pay off.

Safety Contest A report on the results of the N. L. A. 1953 safety competition was presented by Kent Jander, chemical engineer for the association. First he gave a brief resume of the history of the association's safety efforts, beginning with the inception of the contest and of the safety news letter in 1935. Few changes were made in either of these until recent years, said Mr. Jander, but both have now been improved. In January, 1954, the board of directors appointed a safety committee which is, among other things, working on a set of safety posters adapted to the industry problems.

The 1953 contest, said Mr. Jander, set a new record, with 11 plants winning a Certificate of Honor for having no lost-time accidents during the year. They are: Class A1—quarry and calcining plants working 100,000 or more man-hours:

(1) Natividad, Calif., plant of Kaiser Aluminum & Chemical Corp.

(2) New Braunfels, Texas, plant of United States Gypsum Co.

(3) York, Pa., plant of National Gypsum Company.

(4) Luckey, Ohio, plant of National Gypsum Company.

(5) Knoxville, Tenn., plant of the Standard Lime and Stone Co.

Class A2—quarry and calcining plants working less than 100,000 man-hours:

(6) Thomasville, Pa., plant of the J. E. Baker Co.

Class B—underground mine and calcining plants:

(7) Bakerton, W. Va., plant of The Standard Lime and Stone Co.

(8) Marblehead, Ill., plant of Marblehead Lime Co.

Class C—lime calcining plants without associated quarry and mine:

(9) South Chicago, Ill., plant of Marblehead Lime Company

(10) Springfield, Mo., plant of Ash Grove Lime & Portland Cement Co.

(11) Branchton, Pa., plant of Mercer Lime and Stone Co.

Lime-Fly Ash Stabilization In the absence of Richard H. Miller of the Clarkson College of Technology his subject of *Lime-Fly Ash Stabilization Research* was presented by Edward T. Misiascek, an associate. He pointed out that more attention is being given to bases and shoulders as factors in better roads. Soil stabilization can help but it must be done economically. Lime, he said, has advantages over other materials used for this purpose and has been fully tested.

In considering stabilization the following things must be known about the soil:

(1) mechanical analysis, (2) plasticity index, (3) shrinkage characteristics, (4) capillary potential, and (5) moisture density relations. For a good road the soil should be: well graded and predominantly granular, should have a low plasticity index and dimensional stability, should be weak in capillary potential and compactable into a firm mass.

Soils deficient in any of these categories can be greatly improved by the use of lime and fly ash.

According to Mr. Misiascek lime-fly ash stabilization can be done satisfactorily in batch type mixers, in portable or permanent mixing plants or by mixing in place. When the depth of the bed is over 8 in. the processing is done in layers. The base is first compacted with conventional rolling and grading equipment. The wearing surface can consist of a seal coat, or bituminous or cement concrete. He briefly described the N. L. A. Research project at Clarkson which is in its preliminary stages. Three distinctly different

Left to right: Alan B. Cheney (Cheney Lime & Cement Co.); Evans L. Purdy (Keystone Lime Works); Betty L. Reger (National Lime Assn.); Paul F. McCarthy Jr. (Linwood Stone Products Co.); Kent Jander (National Lime Assn.); and Victor J. Azbe.

types of soil are being used which represent a large percentage of the soils encountered in highways throughout the country.

Aglime in Maryland The agricultural value and use of lime in Maryland was the subject of Frank L. Bentz Jr., Extension Soils Specialist, University of Maryland, a former N. L. A. research fellow. He said that the soils vary greatly in Maryland, from the sandy coastal plains to the mountain loams. The use of lime has increased from 60,000 tons in 1931 to about 277,000 tons in 1953 but only 7 percent of the soil in the state is over 7.0 pH and 50 percent is under 6.0 pH, indicating a need for much more lime. With slides he showed what the lack of lime does to spinach, wheat, canteloupes, alfalfa, etc.

Mr. Bentz showed charts on the amount of lime required for various crops and pictures illustrating that lime is necessary for good root growth and that it does not move. Another slide showed the amount of calcium carbonate required to neutralize the acidity caused by fertilizers. Mr. Bentz pointed out that the cost of labor has gone up much more than fertilizer, lime, machinery, etc. The farmer must also be educated to realize that he is not buying lime but calcium and magnesium carbonate, and that lime should be purchased by content rather than by color. He also cited tests in Ohio which show the need for finer grinding of agstone to increase the pH of soil more rapidly.

Lime in Autoclaved Concrete Products John K. Selden, consultant on Autoclaving of Concrete, spoke on *Lime Additions to Autoclave Concrete Products*, a subject which he had discussed at an earlier convention. The work being done at the University of Toledo, he said, was started to show that there is need for autoclaving to improve concrete masonry units and reduce cracking. In slides he showed how much better autoclaved blocks stand up in service than do ordinary blocks and charts were used for the same purpose. There is, he said, a definite trend toward autoclaving by the larger producers and he thinks the smaller companies will follow.

Mr. Selden described the laboratory equipment used in the test work and the tests themselves. The use of fly ash, he said, makes possible lower curing pressures and best results are obtained when half of the cement is replaced with lime. There is little difference in strength, he said, but the lime blocks look much better and have cleaner surfaces and corners. There is a potential market for 500,000 tons of lime annually in this field, said Mr. Selden, and an equal amount in roofing slabs.

Pollution Control The *Latest Developments in Pollution Control* were described by L. F. Warrick, Chief, Technical Services Branch, Water Pollution Control Program, U. S. Public Health Service. He pointed out that after many previous bills had failed Congress in 1948 passed a law making pollution control possible. The primary responsibility for water pollution abatement now lies with the states and the U. S. Public Health Service is charged with interstate control. According to Mr. Warrick a good water pollution control program requires a cooperative approach. The states which have done this have had the greatest success.

Mr. Warrick said that municipalities are realizing their responsibilities but they are building reclamation plants only rapidly enough to keep up with the need for them, and the volume of untreated sewage remains about the same. Slides were used to show the importance of clean water for fish, transportation, irrigation, recreation, etc., and what pollution does to streams. Also illustrated were some outstanding new treatment plants. One Kraft paper mill dewaters its waste and sells the sludge as agricultural lime. Processes in paper and steel mills, in textile plants and citrus canning plants were also shown.

Electric Furnaces David D. Moore, chief of the Economics Division, Battelle Memorial Institute, told of the *Economic Possibilities of the Electric Furnace and Their Significance to the Lime Industry*. He said that up to the end of World War II the electric furnace was used almost exclusively for alloy steels. After the war there was excess furnace capacity and electric furnaces were tried out on low carbon steel for many area markets where the cost of electricity was low. The capital cost of an electric furnace, said Mr. Moore, is much lower than that of an open hearth furnace. The production cost per ton in an electric furnace is very little higher, with the result that the actual total cost is only slightly higher than with an open-hearth furnace. With the increasing cost of other fuels, this difference is expected to disappear.

According to Mr. Moore there is little difference in the slags produced and the amount of lime required by both processes. Only 7 percent of the steel now produced comes from electric furnaces but this is expected to increase. Figures were presented which showed the comparative requirements of raw limestone and lime of the two processes. These showed that the trend toward the electric furnace would mean an increased demand for lime which might bring the demand as high as 500,000 tons annually.

Lime Essential in Glassmaking The importance of lime in glass making was described by Samuel R. Scholes, Emeritus Professor of Glass Technology, New York State College of Ceramics. Except for some of the luxury products, lime is as important as any other ingredient in 95 percent of the glass produced. He illustrated some of the functions of lime in glass manufacturing, showing that CaO and MgO provide durability, Na_2O provides fusibility and solubility, and SiO_2 provides glassiness. With less than 7 percent lime, glass is too soluble while with over 14 percent glass vitrifies or crystallizes.

According to Mr. Scholes, calcium can be introduced in the form of raw limestone or burned lime. The lime has greater economy in heating but creates a storage problem. Precipitated calcium carbonate (whiting) is used in the manufacture of optical and other fine glassware. Lime, he said, is vital to the glass industry but producers must provide the proper grain size and composition. For good glass the iron content must be less than 0.1 percent.

Merchandising Advice The featured speaker at one of the meetings was Frank W. Lovejoy of the Socony-Vacuum Oil Co., Inc., and his subject was *It's Later Than You Think*. He stressed the necessity for shaking off our complacency and doing a real job of selling our products and industries. His basic rules for effective selling are:

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(5) Stick to one issue—most people get confused.

(6) Why?—Let them tell why they don't like your product.

Federal Trade Commission The convention was fortunate to be able to hear a report on the Federal Trade Commission and

(*Continued on page* 202)

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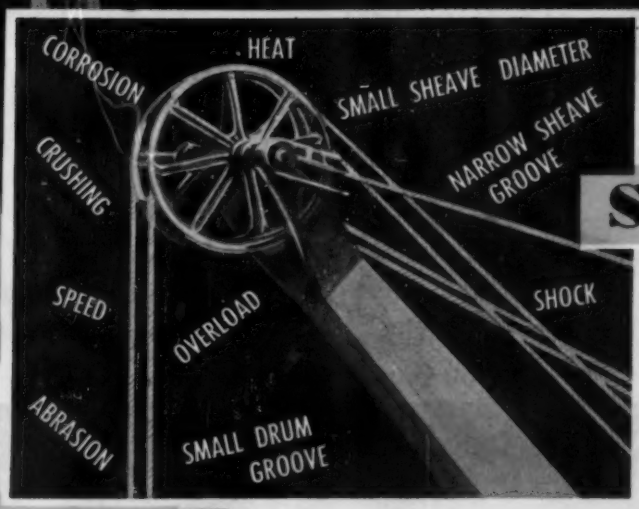

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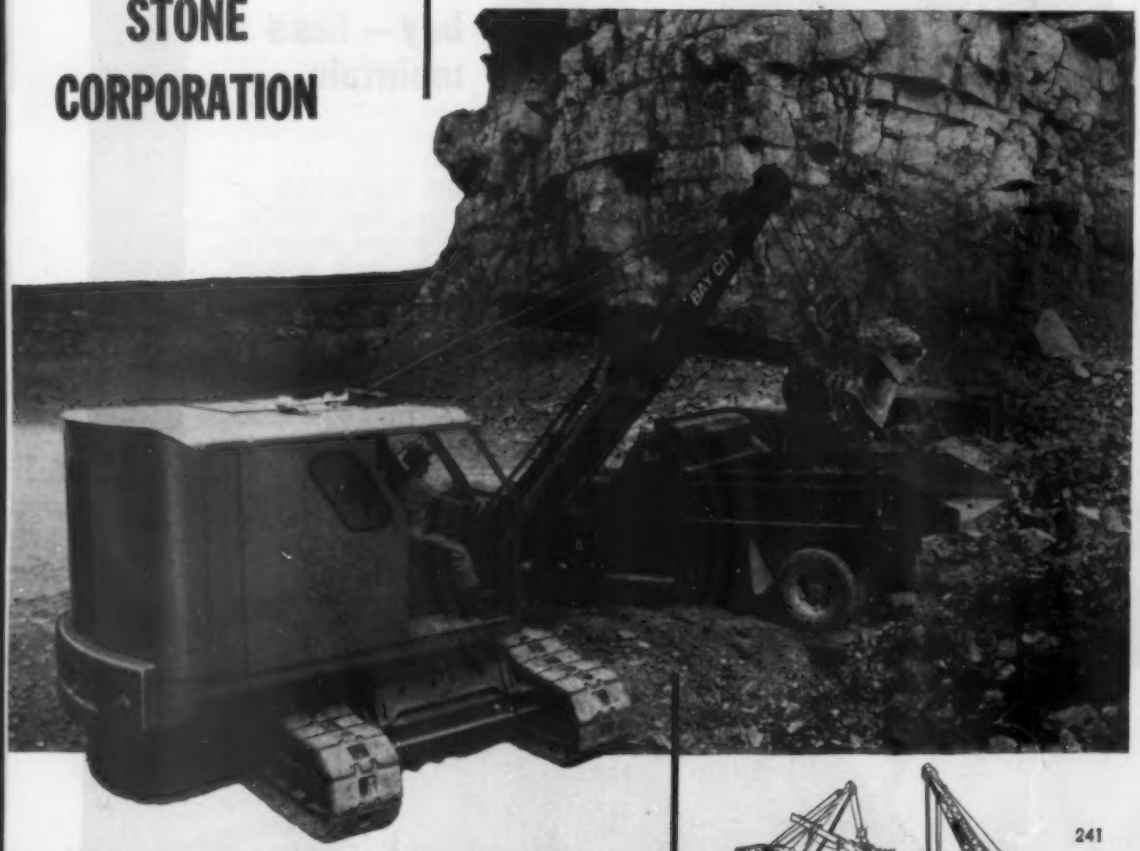

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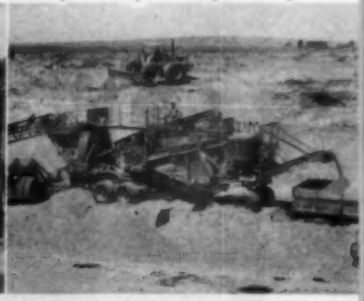
Single source for wide range of complete stationary or portable plants, crushers, matching screens, elevators, conveyors and bins	Yes	Yes	No	No
TOTAL	100%	50%	50%	33⅓%

"61" compact, lightweight and readily portable: Designed for low cost, fast output where extreme accuracy to size is not required.

"101" Newly designed plant with 10" x 36" roller bearing jaw crusher, 30" x 20" roller bearing roll crusher, 30" conveyors and 4' x 12' inclined positive throw type screen.



"201" New Austin-Western plan to produce especially large amount of ¾" and smaller product. 10" : 24" jaw crusher; 24" x 16" rol crusher; 3' x 10' vibrating screen and 24" conveyors.

Before you buy any crushing and screening plant, we urge you to *compare* carefully specific design and construction features. If you do so, we are confident that you will prove conclusively that Austin-Western plants are designed and constructed to out-perform and outlast all other makes.

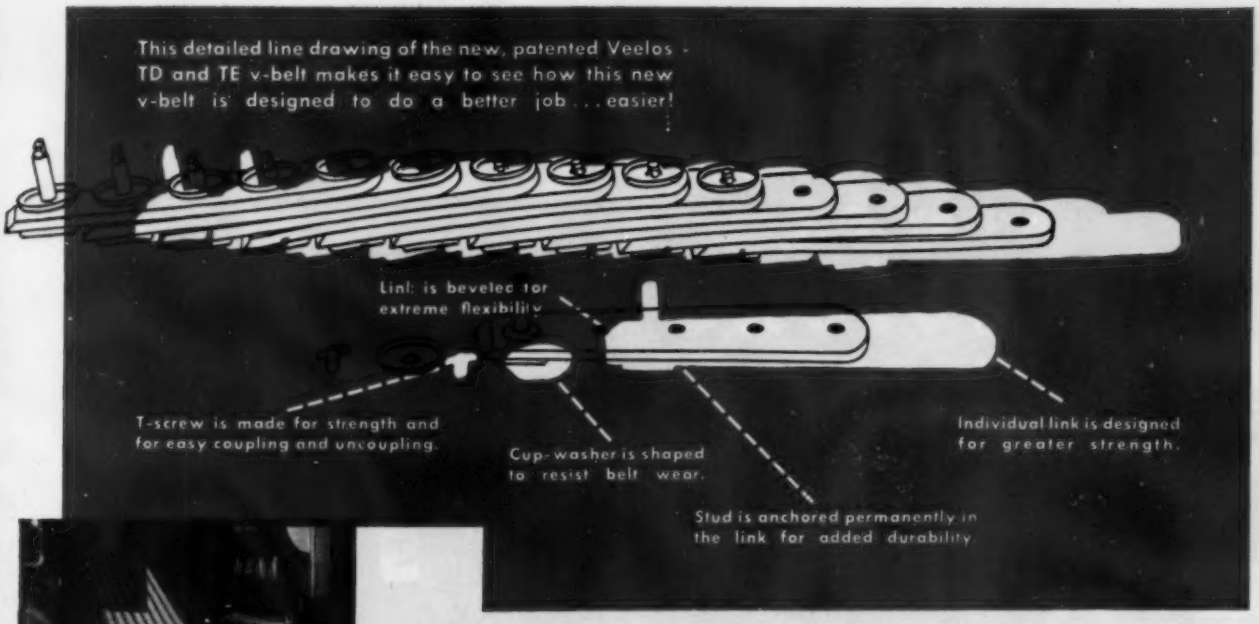
● *For detailed information about any of these points or copies of our latest catalogs, please write: Construction Equipment Division, Baldwin-Lima-Hamilton Corporation, Lima, Ohio, or distributor nearest you.*

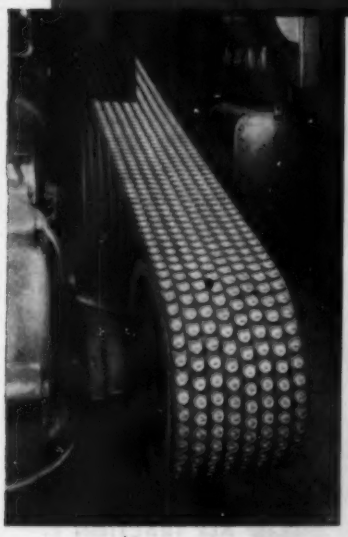
DISTRIBUTORS IN ALL PRINCIPAL CITIES OF THE WORLD

Austin-Western
CRUSHING, SCREENING
and WASHING EQUIPMENT

BALDWIN BLH LIMA-HAMILTON
Construction Equipment Division

BALDWIN-LIMA-HAMILTON CORPORATION
Construction Equipment Division
LIMA, OHIO, U.S.A.


This detailed line drawing of the new, patented Veelos TD and TE v-belt makes it easy to see how this new v-belt is designed to do a better job . . . easier!
Link is bevelled for extreme flexibility.
T-screw is made for strength and for easy coupling and uncoupling.
Cup-washer is shaped to resist belt wear.
Stud is anchored permanently in the link for added durability.
Individual link is designed for greater strength.



New VEELOS

TD and TE Adjustable V-belt

So easy to couple *it installs in minutes*

So strong and durable *it lasts for years*

The new Veelos TD and TE adjustable v-belt is the successful development of a specific v-belt designed for a specific service—D and E drives.

This new Veelos TD and TE v-belt has these basic advantages . . .

It simplifies installation. Links are quickly joined by easy-to-use cup-washers and T-screws to make up individual belts. It's the easiest v-belt to couple and uncouple ever developed. And you don't need to waste time removing outboard bearings.

It lasts longer—is more flexible. New high-tensile strength link combined with new stud, cup-washer, and T-screw gives added durability. New link construction provides maximum flexibility for cooler, wear-resistant running.

Get the complete story of this great new v-belt for D and E drives. Send coupon now for new 8-page illustrated catalog.

VEELOS

THE LINK V-BELT

Veelos is known as Veelink outside the United States.

MANHEIM MANUFACTURING & BELTING CO.
154 Rambel St., Manheim, Pa.
Send copy of your new Veelos TD and TE v-belt catalog.
Company .....
Address .....
..... DOT

ADJUSTABLE TO ANY LENGTH • ADAPTABLE TO ANY DRIVE

"We Haul 25,000 TONS of SLAG A DAY ON Firestone TIRES"

Edw. C. Levy Co., Detroit

Morton E. Harris, Executive Vice President, and Wm. Rafferty, General Maintenance Manager, talking to a driver with an outbound load of slag.

MORTON E. HARRIS

"An around-the-clock, 365-day-a-year operation like ours demands dependable, long mileage tires. It has been our experience that Firestone All Traction Logger Tires meet these requirements. That's why we use them."

(Signed) MORTON E. HARRIS
Executive Vice President
EDW. C. LEVY CO.

The Edw. C. Levy Co. is one of the largest processors of slag in the world. Every 24 hours and every day in the year the 500 units of the Levy fleet are on the job covering an average of 40,000 miles and moving 25,000 tons of slag in and out of the huge Levy plant in Detroit.

In an operation of such giant proportions, tires are extremely important. The standard tire equipment on the Levy fleet is the Firestone All Traction Logger.

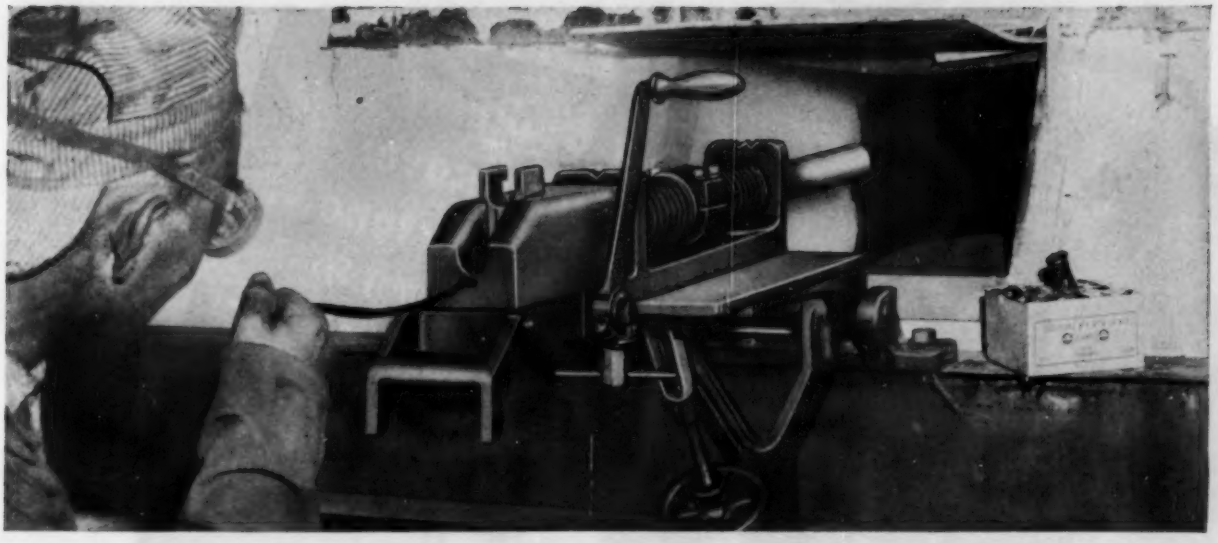
They are on this fleet because they stand up, give long mileage and hold downtime to a minimum.

Whatever your hauling job, Firestone tires will do the same for you. Have your Firestone dealer or store give you complete information. Ask him to show you how Firestone tires can speed up work on the job, cut downtime and reduce your over-all tire expense.

WHEN YOU BUY NEW EQUIPMENT OR REPLACEMENT TIRES—ALWAYS SPECIFY FIRESTONE

Copyright 1954, The Firestone Tire & Rubber Co.

Enjoy the Voice of Firestone on radio or television every Monday evening over NBC



Time cut 112 to 1 in removing kiln rings with the REMINGTON INDUSTRIAL GUN

VARIOUS MOUNTINGS ARE POSSIBLE with the Industrial Gun. Here's one of the most common: secure a 6" or 8" "I" beam across the face of the kiln and simply hook the mount into the bolster. The gun can also be mounted on a truck, a tripod, or a mobile chassis for shooting down obstructions in mines or quarries.

26 hours per month production time gained by refractory plant

"We save 222 man-hours per month—and gain 26 hours' production time!" That's how the superintendent of a large refractory plant in Georgia sums up the reasons he's sold on the Remington Industrial Gun. Formerly, removal of kiln rings took 8 men an average of 28 hours per month. Two men now do the same job *in one hour.*

Hundreds of plants have found the industrial gun to be the fastest, most efficient method for ring removal. In seconds, one man can aim, load and fire the gun. A few shots loosen the ring . . . cause it to crumble when the kiln is rotated. There's never any need to cool and reheat the kiln. *Downtime is cut to a minimum!*

Use of the Remington Industrial Gun can mean big savings in labor, big gains in production for you. Our technicians will be glad to work with you on ring-removal problems at your plant. Just send the coupon for a free illustrated folder with complete information.

"If It's Remington—It's Right!"

Remington DUPONT

REMINGTON INDUSTRIAL SHELLS have tremendous smashing power. They're loaded with a powerful 3-ounce lead projectile that develops 7,475 foot-pounds' muzzle energy.

CUTTING A "KEY-WAY." A few well-placed shots loosen a section of clinker. The ring is weakened by this loss of the arch key . . . will usually fall without additional shots when the kiln is rotated.

Industrial Sales Division P.Q.-7
Remington Arms Company, Inc.
939 Barnum Ave., Bridgeport 2, Conn.

Please send me your free folder describing the Remington Industrial Gun.

*Name*_____ *Position*_____

*Firm*_____

*Address*_____

*City*_____ *State*_____

Six 6" dia. DorrClones recover salable fine agstone... relieve overloaded fines recovery system... at G.&W.H. Corson, Inc.

General view of present fines recovery layout. Bowl Desilter rake product is discharged to flight conveyor and carried to stockpile. DorrClone underflow is discharged directly on ground and bulldozed to stockpile. Desiltor and DorrClone overflows go to waste.

Closeup of six DorrClones installed on superstructure for direct underflow discharge.

Back in 1951, G. & W. H. Corson, Inc. installed a Dorrco Bowl Desiltor to recover plus 325 mesh agricultural limestone from wash water at their operation near Philadelphia, Pa. Results were completely satisfactory — until flow was doubled and the solids loading could no longer be handled by the Desiltor alone.

Economical answer to the problem was the six 6" DorrClones shown in the closeup above. These units now handle 600 of the current 900 gpm total flow. Making a 25 to 40 micron separation, they recover an average of 7 tons per hour of fine agstone at better than 50% solids. The Desiltor recovers 3½ tons per hour at 70 to 75% solids. Total recovery of salable product from both units averages 10 to 12 tons per hour.

This is but one example of how DorrClones can fit into the fine solids recovery picture. If you're losing valuable fines, their modest cost, high capacity-for-size and ease of installation will interest you too. Write for Bulletin 2501, or better still, give us the details of your problem. No obligation, of course. The Dorr Company, Stamford, Conn. *In Canada*, 26 St. Clair Avenue East, Toronto 5.

Better tools TODAY to meet tomorrow's demand

DORRCO

DORR

FIFTY YEARS 1904-1954

WORLD-WIDE RESEARCH • ENGINEERING • EQUIPMENT

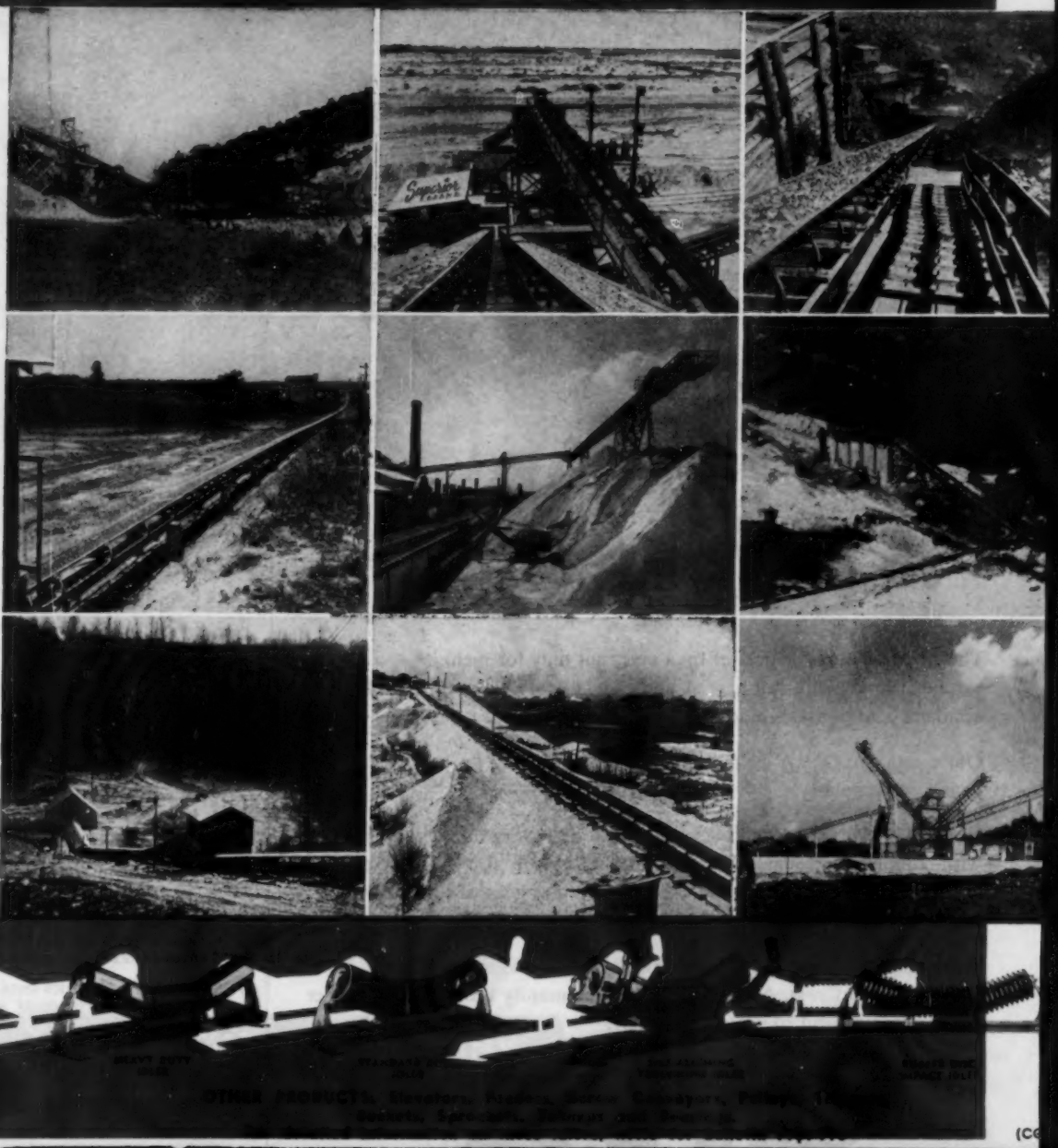
THE DORR COMPANY • ENGINEERS • STAMFORD, CONN.

Offices, Associated Companies or Representatives in principal cities of the world.

STONE HANDLING

These are tough jobs—requiring equipment for long life and uninterrupted service.

That's why these operators specified Continental



INDUSTRIAL DIVISION

CONTINENTAL GIN COMPANY

BIRMINGHAM, ALABAMA

ENGINEERS CGC ATLANTA • DALLAS • MEMPHIS • NEW YORK CGC MANUFACTURI

Once is not enough!

The need for blood is greater than ever, not only for men wounded in combat, but here at home . . . to cure disease, to meet accidents and disasters, and to prepare for civil defense.

Our quota can ONLY be met, if those who give *keep on* giving . . . regularly!

You CAN give more than once . . . as often as every three months with complete personal safety. The more often you give the more often you save a life. For every pint of blood you give goes to someone who needs it desperately.

Remember . . . once is NOT enough. Give blood again and again! Call your Red Cross, Armed Forces or Community Blood Donor Center for an appointment to give blood today.

GIVE BLOOD

...give it again and again

BUSINESS EXECUTIVES!

CHECK THESE QUESTIONS

If you can answer "yes" to most of them, you—and your company—are doing a needed job for the National Blood Program.

- ◯ HAVE YOU GIVEN YOUR EMPLOYEES TIME OFF TO MAKE BLOOD DONATIONS?
- ◯ HAS YOUR COMPANY GIVEN ANY RECOGNITION TO DONORS?
- ◯ DO YOU HAVE A BLOOD DONOR HONOR ROLL IN YOUR COMPANY?
- ◯ HAVE YOU ARRANGED TO HAVE A BLOOD-MOBILE MAKE REGULAR VISITS?
- ◯ HAS YOUR MANAGEMENT ENDORSED THE LOCAL BLOOD DONOR PROGRAM?
- ◯ HAVE YOU INFORMED EMPLOYEES OF YOUR COMPANY'S PLAN OF CO-OPERATION?
- ◯ WAS THIS INFORMATION GIVEN THROUGH PLAN BULLETIN OR HOUSE MAGAZINE?
- ◯ HAVE YOU CONDUCTED A DONOR PLEDGE CAMPAIGN IN YOUR COMPANY?
- ◯ HAVE YOU SET UP A LIST OF VOLUNTEERS SO THAT EFFICIENT PLANS CAN BE MADE FOR SCHEDULING DONORS?

Remember, as long as a **single** pint of blood may mean the difference between life and death for **any** American . . . the need for blood is **urgent!**

NATIONAL BLOOD PROGRAM

Command the market for low-cost aggregate with the

Commander

Cedarapids — Built by IOWA

TODAY, as never before, you need big volume output *and low-cost production* to command the market for aggregate.

That's what you get with the Cedarapids Commander!

The Commander Plant shown above produced between 300 and 400 tons per hour of 1¼" material with 20% crushing, and the two draglines feeding it couldn't keep it up to full capacity!

Low maintenance and operating costs, the result of Cedarapids-Quality construction and field-experienced design, keep production costs at absolute minimum.

For today's stiff competition, the producer who turns out *more* tons per hour, at *less* cost per ton, is top man on the profit pile.

Ask your Cedarapids distributor to show you all the Commander advantages.

HERE'S WHY YOU MAKE MORE PROFIT WITH THE COMMANDER

- Big 30" x 22" Roll Crusher provides the increased secondary crushing capacity required for meeting today's specifications for smaller sizes of crushed aggregate.
- Large 48" x 10' Horizontal Vibrating Screen gives extra screening capacity to balance the greater roll crusher output.
- 30" wide conveyors throughout the plant easily handle the high capacity. The Commander is designed to eliminate any possibility of bottlenecks.
- You get this increased capacity *with no increase in maintenance or operating costs!* That's the Commander's profit-benefit to you.

WRITE TODAY FOR BULLETIN COM-1

It contains complete details of all the features that make the Commander "the plant of the year" for low-cost aggregate production.

IOWA MANUFACTURING COMPANY
Cedar Rapids, Iowa, U. S. A.

Master Bituminous Mixing Plant

Vibratory Soil Compactor

Motorized Head Pulley

Model C-60—6000-lb. Bituminous Mixing Plant

Dependable blasting starts with a dependable blasting machine. And this new Atlas blasting machine is designed to give you every advantage in dependability and safety.

Hand actuated generator operation does away with battery replacements and gives consistent voltage in both hot and cold weather.

Built-in Volt Meter shows actual voltage while the condensers are being charged.

Adequate voltage assured. The condensers cannot discharge into the firing circuit below a predetermined voltage.

No danger of a residual charge in the condensers. With the condensers connected directly to the generator, any residual charge is dissipated quickly.

Simplified operation. The generator is hand operated. The firing trigger may be closed or open during the voltage build-up. Only when the voltmeter needle indicates optimum power can the firing circuit be activated.

Waterproof. The entire unit is sealed and the switch is waterproof. The new Atlas blasting machine is always ready to go . . . under all conditions.

Sturdy, welded steel case is compact and easy to handle. The whole machine weighs only 30 lbs.

Insulated-type terminals. Binding post screws are made of a non-conducting material. Terminals are well separated for maximum safety.

For complete information on this new blasting machine, get in touch with your Atlas representative. He will be glad to give you full details and arrange a demonstration if you wish.

ATLAS

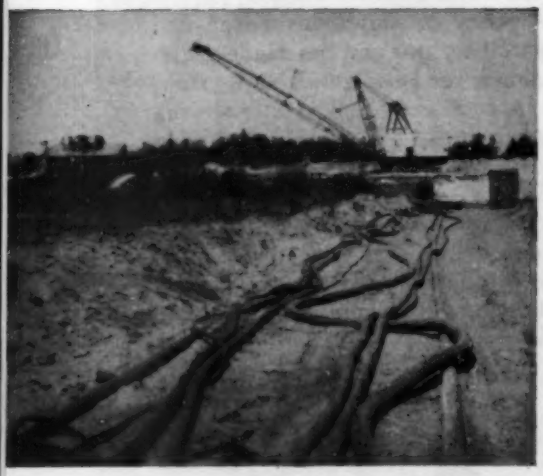
ATLAS EXPLOSIV

"Everything for Blasting"

ATLAS POWDER COMPANY, WILMINGTON 99, DELAWARE

Offices in principal cities

lerwater operation holds no peril for these Haza- d cables. Skid mounted junction box contains four) amp. circuit breakers . . . single cable leads from nsformer bank; four branch circuits go to the control se near the shovel (below). The 500 horsepower or which operates the pit-pump used for pumping phosphate-bearing matrix to the washer also gets power through Hazacords.



ubbing 17 yards of phosphate rock in a single bite, enormous dragline supplies raw material for fertil- s and chemicals produced by the Virginia-Carolina mical Corporation. Power is furnished by thousands eet of Type SH-D, 5000-volt Hazacord cable.

Hazard's exclusive ZBF sheath—cured under pressure in a continuous metal mold—is one reason why Haza- cord cable can take the rough treatment it gets being dragged over this rugged Florida terrain.

V-C CHEMICALS

SELECTS HAZACORD LONG-LIFE SHOVEL CABLES FOR RUGGED PHOSPHATE MINING OPERATION

Hazacord Type SH-D was used exclusively by V-C for this important mining job. The safest and most widely used type for high-voltage work, Hazacord Type SH-D has copper shielding braid over each insulated conductor . . . grounding conductors in the interstices. For use up to 15000 volts.

On *every* job . . . from a giant dragline to a portable electric saw, Hazacords are setting new standards for long, economical service from cords and cables. Get complete information from your Hazard representative, your jobber or write to us today. Hazard Insulated Wire Works, Division of The Okonite Company, Wilkes-Barre, Pennsylvania.

HAZARD HAZACORD *Mold-Cured* portable cables

SUPERIOR Gyratory CRUSHERS

29 in 3 YEARS!

SUPERIOR primary and secondary gyratory crushers have been making a big name for themselves since they were introduced three years ago. Twenty-six are installed and operating... three are under construction now, including a huge 60 x 109 machine — largest crusher the world has ever known.

A policy of simplifying design and controlling quality has made Allis-Chalmers the leading builder of crushers. A continuing policy of *improving* crusher design has greatly extended this leadership.

This vast backlog of crusher application experience — over 75 years of it — is always available to you when you want to make sure of a successful installation. Allis-Chalmers, Milwaukee 1, Wisconsin.

A-4319

Superior is an Allis-Chalmers trademark.

NEW 32-Page Book Contains Helpful Crushing Data

- Packed with factual "how to" information on figuring hp requirements, impact and compressive strengths.
- Step-by-step procedures for estimating gyratory crusher sizes, capacities. Examples are worked out.
- Many other valuable facts on gyratory crusher operation . . . application . . . engineering.

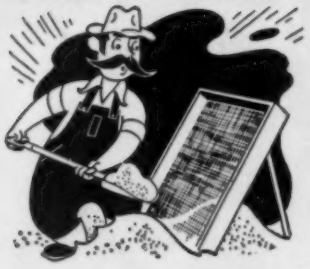
It's a book you'll want to have and keep!

ALLIS-CHALMERS

A-C ALLIS-CHALMERS

Sales Offices in Principal Cities in the U. S. A. Distributors Throughout the World.

Screenings



by Ray L. Smith, Jr.

WE all have our own style when the time comes to take a pencil in hand and put thoughts on paper. One seems suddenly to remember the dictionary and the grammar rules and these things complicate expression. So in future issues we will try to draw a line someplace between being "natural" and being downright illiterate.

Well, all right. It must be our Pennsylvania Dutch blood coming out. You know, as the little "Dutcher" said, "when it makes the little red house (caboose to you) the train is all, ain't Mama?"

Push Button Era

"COFFEE Break — Boon or Boomerang?" is the headline over a press release just received from the Bert Mills Corp., St. Charles, Ill. It reports large numbers of management officials are convinced of the coffee break benefits in reducing fatigue, boosting moral, sharpening production efficiency, lowering accident rates, and cutting down absenteeism.

Maybe that headline intrigues you as it did us so we went on to read: "Plant managers, however, have found that coffee breaks can boomerang too. When they stretch beyond reasonable time limits, the cost to production becomes exorbitant. For example, a plant with 1,000 employees who make an average of $1.80 per hour pays $300 in wages every 10 minutes. If its coffee break takes an extra 10 minutes a day, it costs the company a minimum of $1,500 each week for the excess time. And costs of lost production may be even more jolting."

According to Bert Mills, the problem has been licked through—mechanization. A Coffee Bar vending machine is being manufactured to serve hot coffee according to the users' taste—with or without cream or sugar, with both, or plain. A built-in change maker supplies change from dimes and quarters.

Just for kicks we decided to test one of these machines ourselves. Spotted one in the railway station on our way home, one evening, with exactly six minutes to spare. Confidently walking up to it, we dropped a thin dime in the slot, all the time wondering how much coffee we would get for a dime. Perhaps our dime was a little too thin, for after a loud plink, silence reigned, and we suddenly realized that our dime had been "tooken" and we weren't going to get any coffee.

The second time, we chose a quarter, the machine started to groan, a cup dropped down into the rack and coffee began pouring out of the tube. When the cup was a little over half-full, the tube gave forth with an extra hard spurt and the cup tipped

over, spilling hot coffee down our trousers and over our shoes. Change in the amount of one thin dime snapped into the receptacle provided and we were poorer by another fifteen cents. Making a fairly dignified withdrawal, it dawned upon us, yep, you guessed it, the train had pulled out three minutes ago.

Aside from the funny side we learned a lesson we'll not forget for a long time. The little cup of coffee that we didn't have, cost: (1) two attempts at pushing the button—twenty-five cents; (2) shoes shined —twenty-five cents; (3) suit cleaned and pressed — $1.95, total — $2.45. Pretty wife insisted the man she married in a blind moment, is just plain nuts.

Potpourri and Succotash

WATCH for a new traffic law soon to control our postmen in delivering scootermail. Or it could be we will see them dashing around on roller skates, with water-wing attachments after a heavy storm. Reports have it that tests are going on in certain cities to relieve the mail carrier's back, and the corns on his feet. Scooters, push-carts, and miniature autos are among the tested possibilities. Why hasn't this been done long ago? We don't know of any individual in government service who deserves an orchid more than the chap who plods his beat in all kinds of weather, and always with a smile.

Here's a big word you can blame on the Greeks—and it might be food for thought on the second Friday in August — TRISKEDEKAPHOBIA. It means, so we are told but can't guarantee, "fear of the 13th." If your men don't report for work on Friday, August 13th, they probably remained in bed because of Triskedekaphobia. It could be, too; a new word for hangover.

All The Way From Iowa

THERE'S the story of the young lady from the Corn Belt who got a Federal Government job, and wrote home to describe it: "I work in the data analysis group of the aptitude test sub-unit of the worker and analysis section of the division of occupational analysis and managing tables of the bureau of labor utilization of the War Manpower Commission, which is under the office of Emergency Management." The girl's mother wired, "Come home immediately."

Help! Help!

IF there's one thing an editor tries to do, it's to please his subscribers. We're going to get a tremendous kick out of writing this department to you once a month, but we know it has to please you too. So be a "talent scout" and send on anything you happen to see, that can be used in future issues. Don't be bashful. This is not a one-man show.

A general view of the 400-t.p.h. plant supplying aggregates for concrete to be used in constructing a 15,000-ft.-long runway at Edwards Air Base in the Mojave Desert.

Dry-Batch Plant to Supply 1,000,000 Tons of Aggregates For Super-Plane Runway

By HARRY F. UTLEY

another ON THE SPOT report

EDWARDS Air Base in the Mojave Desert near Lancaster, Calif., is the Army Air Force's new test center, where most of the recent jet plane speed records have been established. Originally a World War II training facility, the base is being progressively expanded for the testing of all types of special military aircraft.

Under construction there now is probably the largest concrete runway ever built. Certainly the longest, 15,000 ft., the huge airstrip is undoubtedly also the widest (300 ft.) and the thickest (17 to 19 in.).

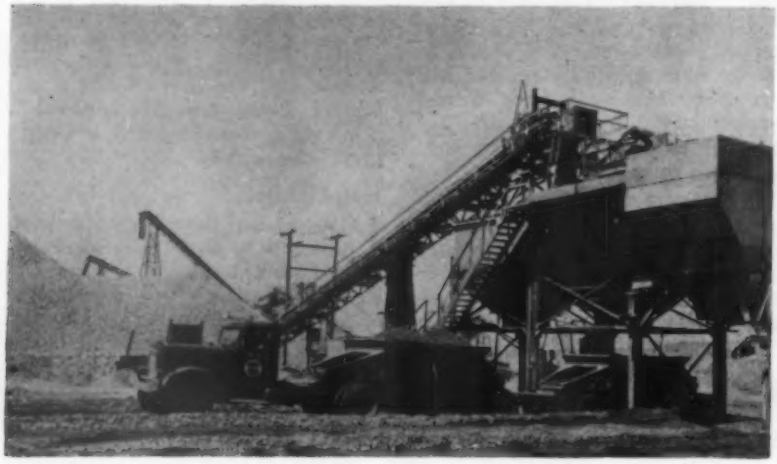
Contract for the runway, designed for 500,000-lb. gross loadings to accommodate planes nearly twice the size of the present B-36 bomber, was awarded last year by the Los Angeles District, Corps of Engineers, to the Ford J. Twaits Co., Morrison-Knudsen Co., and R. A. Westbrook on their joint bid of $6,578,881.

The contractors have set up a dry-batch plant alongside the air strip to supply the pavers, and have established a desert sand-and-gravel plant to produce the aggregates.

After considerable exploration, the aggregate pit and plant were set up on a site selected near the town of Littlerock, 27 miles south of the base. While this entails considerable haulage of the finished aggregates, the deposit is ideal as to quality and proportions, and the resulting simplification of processing more than offsets the length of haul from plant to job. The pit contains a sufficient amount of balanced fines to match specifications without involving the grinding of oversize or other extra treatment in the flow-sheet. Few large boulders are encountered and, since the top size required on the job is 3 in., the crushing demand is kept to the minimum.

Pit and processing plant adjoin, the pit being excavated by a Northwest 80D 2½-cu. yd. shovel, which loads directly to a fleet of five end-dump Euclid trucks, each carrying about 18 tons. The Euclids dump into a 40-ton hopper at the plant. With the excavated pit-run well balanced and relatively free of clay or other deleteria, the output is upwards of 400 t.p.h. of washed and sized aggregates.

Processing is done largely with Diamond Iron Works equipment, starting with the Diamond 24- by 36-in. primary jaw crusher beneath the hopper. This reduces the top size to minus 5-in. The combined material is conveyed to a Diamond No. 95 portable plant for secondary reduction and initial separation. The portable unit is equipped with jaw and roll crushers, a triple-deck dry screen, and rotor-lift elevator. With

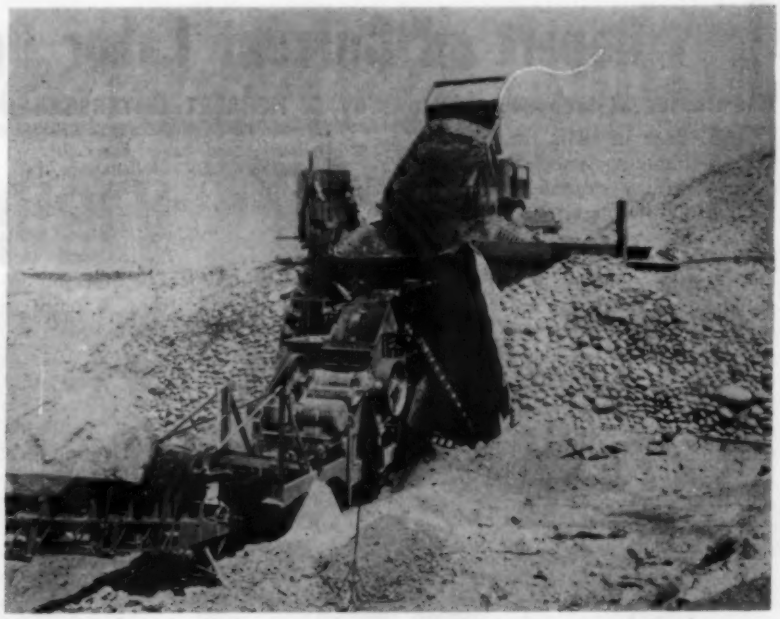


At this station truck and trailers are loaded with finished aggregates for delivery to airstrip jobs.

this setup it is possible to make the final reduction in size and balance up the required sizes at a 450-t.p.h. clip, delivering the minus 3-in. product to the washing-and-sizing tower for the final clean-up and classification.

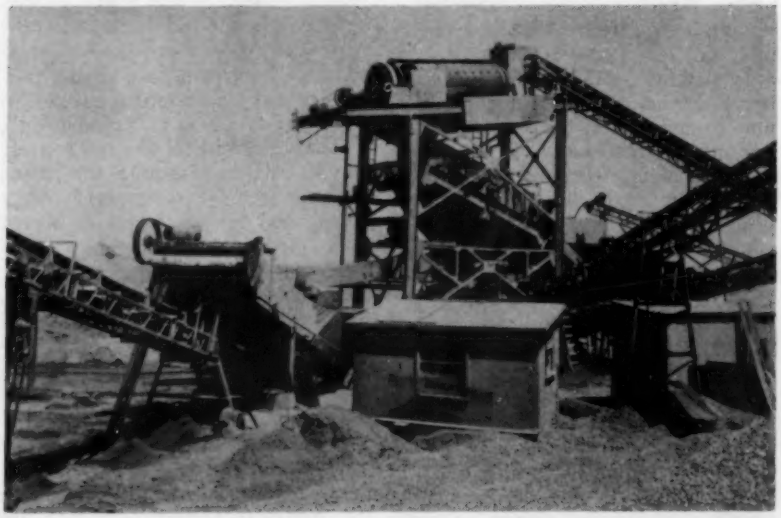
All the dry aggregates first pass through a Diamond scrubber before being sized on spray-equipped Diamond screens. The sand is prepared and dewatered by a twin-screw Eagle classifier; and the three coarse aggregates with top sizes of 3, 1½, and ¾ in., and the sand, are separately stockpiled by stacker conveyors over a 410-ft. long tunnel. The recovery belt delivers to an inclined conveyor running up to the loading station where the trucks are loaded before starting the 27-mile trip to the batch plant at the Edwards base. If neces-

(*Continued on page* 202)



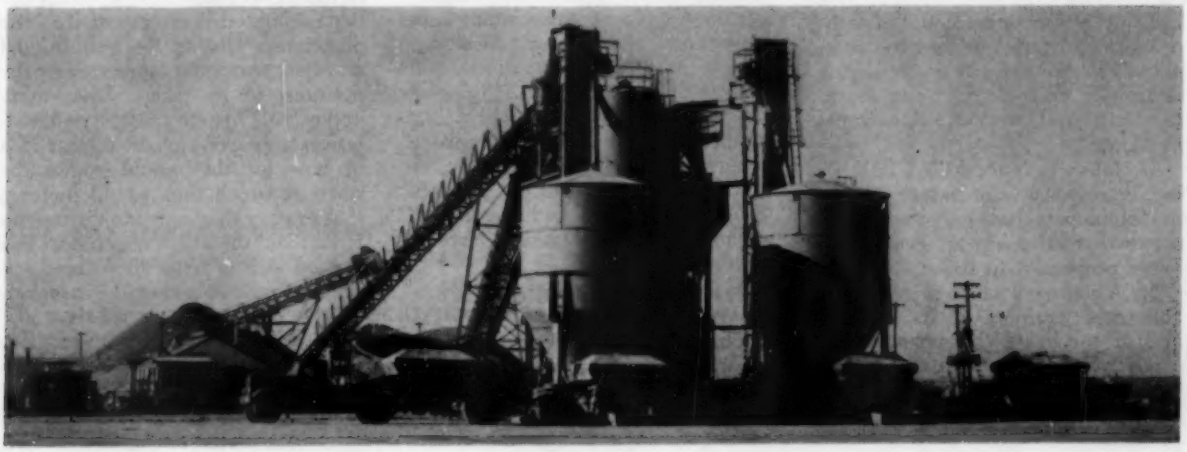
Above: One of the pit trucks discharging into the hopper over the primary jaw crusher.

Below: The washing-and-sizing tower with the revolving scrubber overhead. At the left are the sand spirals.



Above: The twin-screw sand classifier and the stockpile conveyor. The shuttle belt (background) distributes the sand over a wide area for drainage.

Below: A general view of the concrete batching plant at Edwards Air Force Base.



Report on Current Labor Developments

The Causes of Industrial Peace

By S. HERBERT UNTERBERGER
S. Herbert Unterberger and Company
Industrial and Labor Economists
Washington, D. C. - Philadelphia, Pa.

Back in 1946, the National Planning Association agreed with a statement made by Clinton S. Golden that "... the time has come when, instead of looking into the causes of (industrial) conflict that we know and hear so much about, we ought to try to discover *how much peace there is and what makes peace.*" Accordingly, it studied in detail the labor management relations of a number of companies and unions which had experienced successful and peaceful industrial relations, in an effort to discover whether "what makes peace" in some companies can be transferred to others.

The studies of the Planning Association were recently completed and summarized. In general, the group has accomplished admirably the first of its goals, namely, to determine "what makes peace" in some companies. Whether that knowledge can, in fact, be transferred to others, only time will tell.

In making their studies, the National Planning Association found that environmental factors were important but not necessarily controlling in deciding whether a company and union could live together in peace. They found that the following circumstances were favorable to industrial peace:

1. A medium sized company, primarily because it is small enough so that it is not compelled to set or to follow specific patterns and yet is large enough to avoid the problems of particular personalities.

2. A steady production pattern, so that it is not plagued with the casual nature of the employment, pronounced seasonal swings, or production crises.

3. Only a modest amount of technological advance, so that the company is progressive but not changing so rapidly or radically as to create frequent and serious adjustment problems.

4. Jobs which are skilled, interesting, or responsible in nature, so that the employees have a special and personal relationship to them and a lower propensity to strike.

5. A company which is in a favorable cost position in its industry and/or one in which labor costs are a relatively small percentage of total costs, so that there is some room to negotiate for the settlement of labor problems.

6. A company with an expanding market insulated, if possible, from extreme cyclical fluctuations and severe competition, so that job insecurity resulting from inability to sell the product is reduced.

7. A company which is firmly rooted in its locality, so that it must preserve peace because the alternative of moving away is not available.

8. A steady, tractable work force, which will preclude instability on the part of the company and of the union.

9. Location in a metropolitan area, so that the labor force can be expanded and contracted without serious repercussions and without involvement of the entire community in plant labor problems.

10. A plant operating in a high-wage industry but in a relatively low-wage community, so that it may pay, with ease, at or above the community wage levels and have greater latitude to make wage settlements.

11. Operating in a "union town", so that the workers are more likely to desire organization, the trade union movement to support it effectively, and the employees to accept it as a natural development.

12. A secure union with secure leaders and a homogeneous union membership, so as to avoid rival unionism, factionalism, and heterogeneity of interest. Pattern-following unions with little local autonomy were found to be more conducive to peace than unions with a high degree of local democracy and autonomy.

13. Employers who follow patterns in contractual matters where the firm can afford it, particularly where a strong employees' association is in the picture, and who use local discretion in settling non-contractual matters.

14. Finally, situations where the company and the union have been living together for a long time, so that the rough edges of the relationship have worn off and the mutual advantages of cooperation are recognized.

Rules for Successful Contract Negotiation

To management people, perhaps the most practical results coming out of these studies were the conclusions with respect to successful procedures for negotiating new agreements used by companies which were notable in achieving industrial peace. Here are those results:

1. Relationships were generally most successful when the negotiators on both sides had authority to make decisions and commitments. Mere discussions between "messenger boys" almost invariably led to prolonged negotiations, misunderstandings, and confusion. On the other hand, if the company representatives had the authority to bargain, it made very little difference whether they were staff representatives, (that is, industrial relations directors) or line representatives (persons in charge of operations). On the union side, moreover, local officers appeared to be successful bargainers, but so were international representatives and top union officials, provided that *one person* was given the responsibility for leading the talks.

2. Some kind of prenegotiation in advance of normal conferences on final contract terms contributes to peaceful relations. Surprises of any kind are likely to upset negotiations. Each party has greater confidence if it has a thorough understanding of the issues to be raised by the others, as well as of the social, political, or economic background of the various demands which are presented. Wherever the parties have been successful in solving problems and in developing effective communications, each probably entered new contract negotiations with a fairly sophisticated awareness of the other's needs and with a reasonably good idea of the probable reactions to any given demand.

3. Peaceful negotiations were facilitated when both parties came to conferences armed with factual information pertinent to the issues being negotiated. This meant that the negotiators had to be well briefed on the reasoning underlying the positions to be taken. Even more important, management representatives appeared to have a clear idea of how far they could go, of the stage at which they would prefer a strike rather than agree to the union's terms; and the union negotiators had a good idea of what they could settle for without asking the membership to walk out.

4. In the most successful relationships the negotiators saw themselves as seasoned traders rather than as belligerent table pounders. The

(*Continued on page* 202)

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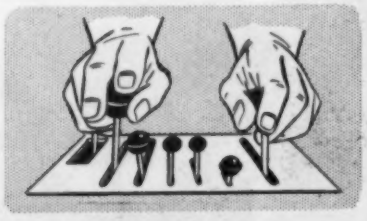

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Marblehead's

Two-Kiln Refractory Dolomite Plant Under Full Production

MARBLEHEAD Lime Company, a subsidiary of Material Service Corporation, Chicago, and one of the nation's oldest lime producers, recently placed into full production a large-sized refractory dolomite plant at Thornton, Ill. (about

By KENNETH A. GUTSCHICK

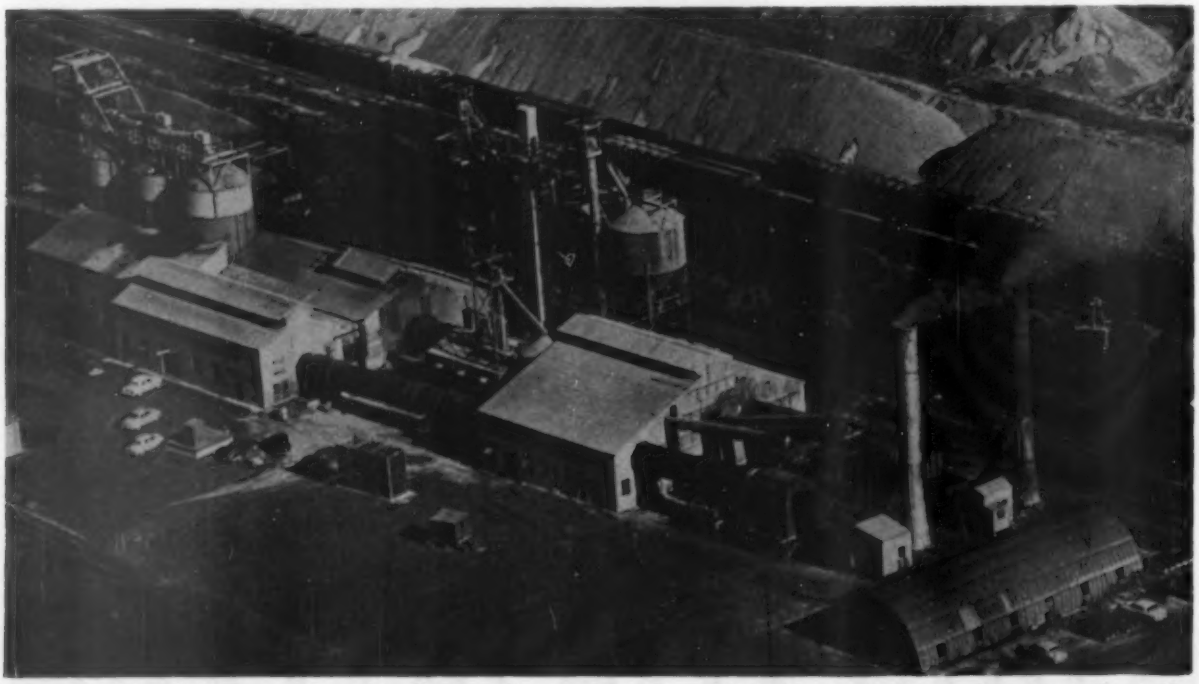
25 miles due south of downtown Chicago). The plant, which is located adjacent to the firm's pressure hydrated lime plant*, consists basically of two 9½- by 250-ft. rotary kilns. It was constructed in two stages, the first kiln beginning operation about 4 years ago and the second kiln a few months ago. The plant has a capacity in excess of 550 tons per day.

The newer kiln was added in order to meet the increasing demand for refractory dolomite by the American steel industry, particularly in the South Chicago-Gary steel district, which has recently surpassed the Pittsburgh district as the nation's leading steel producing center. The product is used to line basic open-hearth and electric furnaces. Because of the proximity to this major market and also to an extensive deposit of high-purity dolomite found at the Thornton quarry, the plant has a strategic location.

From an operating viewpoint the Thornton plant exhibits an extraordinarily high degree of quality control, efficiency, and flexibility. Beginning with the accurate blending of the raw materials and carrying on through the burning process and the sizing and oiling of the finished product, exceptional quality control is attained, thereby resulting in a finished product of high uniformity. A major facet in the quality control program is afforded by the unique layout of the plant facilities, which enables one man (the kiln operator) to visually and manually control the operation of both kilns. This is accomplished by proportioning the raw materials near the discharge end of the kilns, and utilizing long kiln-feed belt conveyors—a practice which is in direct contrast to the conventional method of performing this step at the kiln feed end. Under this arrangement the kiln operator can constantly check the feed belt. Control is also effected by synchronizing the kiln speed with the proportioning feeders, utilizing a conventional motor-generator set in the case of one kiln and electronically-controlled Dynamatic eddy-current couplings in the case of the newer kiln. This use of eddy-current couplings is relatively new to the pit-and-quarry field, and will be described in detail later.

The Thornton plant also features the use of specially-designed counter-flow contact clinker coolers, which permit nearly 100 percent recuperation of the sensible heat for combustion purposes; pug mills for thorough oiling of the finished product; and a cyclone collector ahead of the coal feeder fan for each kiln. This latter practice substantially reduces the fan impeller wear, since about 80 percent of the pulverized coal feed is discharged directly to the burner pipe, the remainder passing through

*This plant was described in PIT AND QUARRY, Vol. 45, No. 7, January 1953, pp. 155-160 (*Marblehead Lime Co. Produces High-Quality Pressure-Hydrated Lime for Chicagoland Market.*)

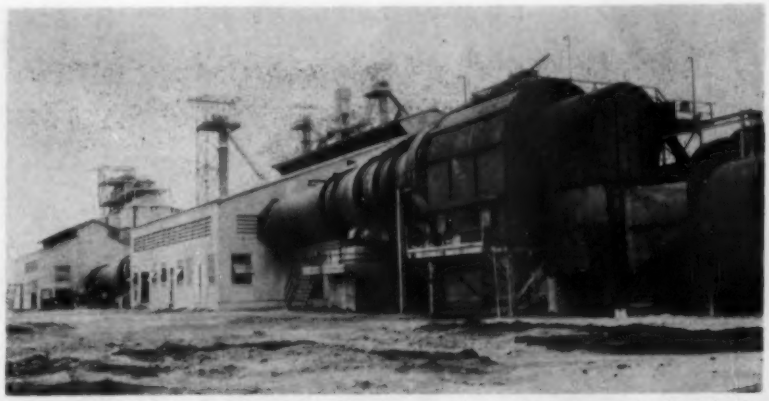


General view of Marblehead Lime Company's refractory dolomite plant at Thornton, Ill. The plant features a unique layout, wherein the raw materials are proportioned near the burner floor and fed to the kilns via long belt conveyors.

the fan. Flexibility in plant operation is particularly evident in the handling of the clinker, through use of an elaborate interconnected system of pan conveyors. If the conveying circuit serving one kiln breaks down, the material can be bypassed to the other conveying circuit, thereby preventing a kiln shut down.

Raw Materials In the production of refractory dolomite the company utilizes an exceptionally high purity dolomite (minus 3/8-in. size) and an iron oxide additive. The dolomite, obtained from the Material Service Thornton quarry, is quarried from the Racine-Guelph (Upper Niagaran) formation, which is the same formation outcropping along the western shore of Lake Michigan, at Niagara Falls, and at the important Ohio finishing lime district. Geologically speaking the Thornton deposit is a classic example of a large reef structure, typical of the Niagaran formation, whose reef-core and reef-flank beds consist of dolomite exceeding 99 percent in calcium carbonate—magnesium carbonate content. The dolomite occurs in massive, poorly-defined beds and is gray to buff, medium-grained, porous, and locally very fossiliferous.

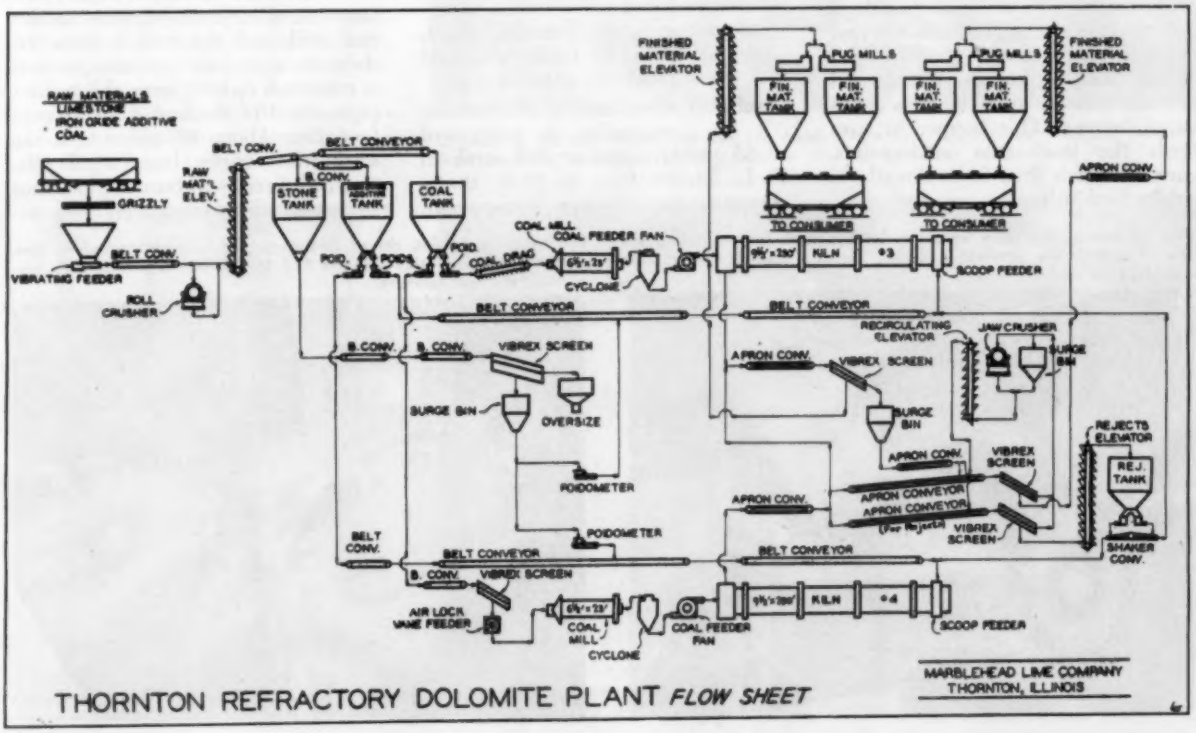
Southern Illinois low sulphur bituminous coal, obtained from the Material Service Corporation's Freeman coal mines, is used exclusively in the burning operation. The coal is rated at 12,225 B.t.u. per pound and is 1-in. to 7/16-in. in size.



Closeup of the kiln feed end, showing the dust chamber and duct work leading to the induced draft fan.

Raw-Material Handling All of the raw materials are brought in by rail in hopper-bottom cars and unloaded into a single large track hopper fitted with a grizzly. Car unloading is facilitated by an Allis-Chalmers car shaker and a Clyde car puller. The material is fed singly to a short 24-in. conveyor belt *via* a Jeffrey-Traylor vibrating pan feeder and delivered to the top of the storage tanks by means of an 80-ft. high bucket elevator. There the material is transferred to a unique Barber-Greene 24-in. by 20-ft. pivoted belt conveyor, which leads to a trio of chutes, mounted side by side (see photo). One chute (the middle one) leads directly to the stone storage tank, the second to a 24-in. by 32-ft. belt conveyor feeding the iron oxides additive tank, and the third to a 24-in. by 60-ft. belt conveyor feeding the coal tank. This pivoted conveyor is swung on an overhead rail through an arc of about 5 degrees by means of a cable; it is operated from ground level by the car unloader. By means of individual stops for each of the three chutes, the operator can maneuver the conveyor entirely from the ground level.

The raw-material-handling system is designed to handle 350 t.p.h. For the handling of frozen material during winter operation, the company uses a McLanahan single roll crusher in circuit with the car unloading belt conveyor. The storage tanks are of all-welded steel construction; each tank holds approximately 725 tons of material.



Unloading of raw material is facilitated by this car shaker; all materials are handled on the same conveying system.

This pivoted belt conveyor, operated from ground level, delivers the dolomite, iron oxide additive, and coal to storage.

Raw-Material Blending As mentioned earlier the Thornton plant features the proportioning of raw materials near the burner floor, thereby enabling the kiln operator to check constantly the feed belt serving each kiln. A battery of six Schaffer 20-in. poidometers (three for each kiln) are used to accurately proportion the raw materials; each kiln is thus served by poidometers handling stone, iron oxide additive, and coal respectively.

The details of the feed arrangement are of interest. (See flow diagram.) Because of space limitations, the two sets of poidometers serving the iron oxide additive tank and the coal tank are mounted directly beneath these tanks. The stone tank, however, is served by a two-stage belt conveyor which delivers the raw dolomite to a small Hewitt-Robins Vibrex scalping screen, the desired product passing directly to a 5-ton surge hopper. This hopper in turn feeds the two stone poidometers, each of which then feeds directly to a kiln feed belt.

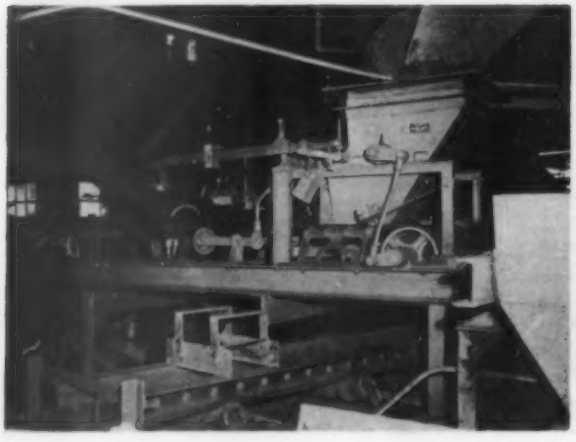
The operation of the weighing feeders is synchronized with the kiln rotation. The drive for each unit serving the first kiln in a 2- or 3-hp. motor through a Link-Belt variable-speed drive and a worm gear reducer. The drive for the units serving the new kiln consists of a Dynamatic 3-hp. Adjusto-Speed or motor-clutch coupled to a Link-Belt worm gear reducer. (In the Adjusto-Speed unit, an a.-c. motor and an air-cooled eddy-current coupling are combined.)

The combined raw materials (9 percent of the feed is represented by the iron oxide additive) are conveyed to the kilns *via* a two stage 18-in. belt conveyor measuring 380 ft. in overall length. The material is then chuted to a scoop feeder, somewhat unique to the industry, which charges the kiln; the feeder is located 6 ft. back from the exhaust end.

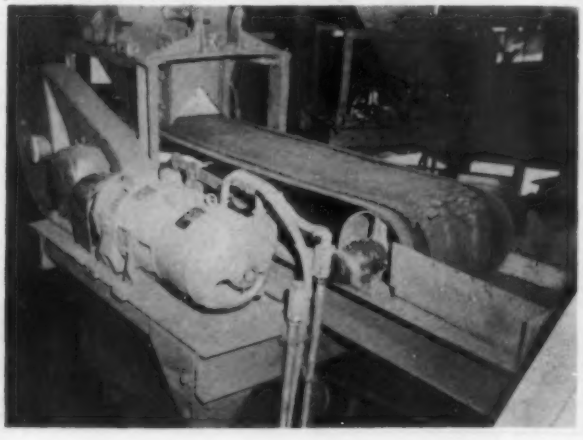
Coal Mill Coal used in the burning operation is pulverized to 85 percent passing 200 mesh in F. L. Smidth 6½- by 23-ft. three-compartment airswept Tirax mills, one to a kiln. The mills, which are driven at 26 r.p.m. by 150 bp. induction motors through Farrell-Birmingham herringbone reducers, are lined with both forged steel and molychrome lining. Each mill possesses a drying compartment, a primary grinding compartment charged with 1½-in. to ¾-in. forged steel balls, and a finish grinding compartment charged with ¾-in. balls (also forged steel). The coal is heated in the mills by air drawn from the kiln-hood; the air-inlet temperature varies from 200 to 450 deg. F., depending principally upon the coal moisture. The outlet coal temperature is maintained at 170 deg. F.

A unique arrangement is used in the coal feed circuit. Primary air from the kiln passes directly to the coal mill, and the coal is then fed through a cyclone collector, which is mounted directly over the burner pipe ahead of the high-pressure coal feed fan. About 80 percent of the feed (the coarser fraction) is discharged directly to burner pipe, thus bypassing the fan. Under this ar-

View of one of the 20-in weighing feeders used for regulating the flow of coal to the airswept ball mill, the coal feed is synchronized with kiln rotation.



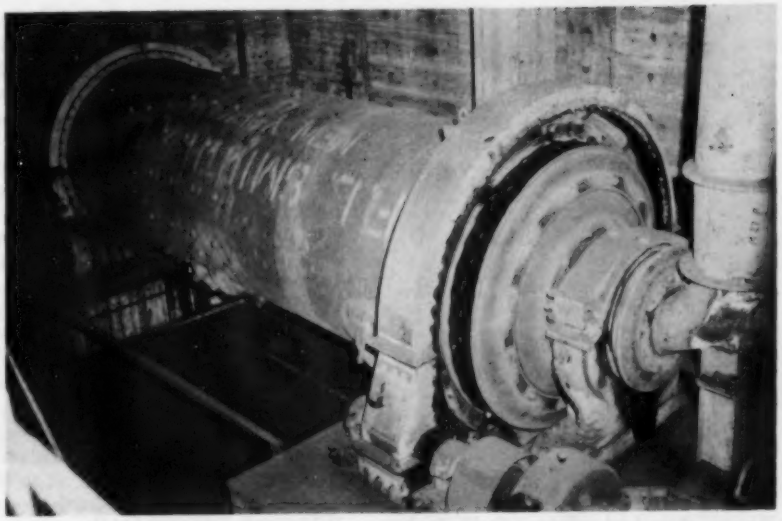
This weighing feeder, driven through an eddy-current coupling, proportions the iron oxide additive fed to the kiln; a similar unit proportions the raw dolomite.



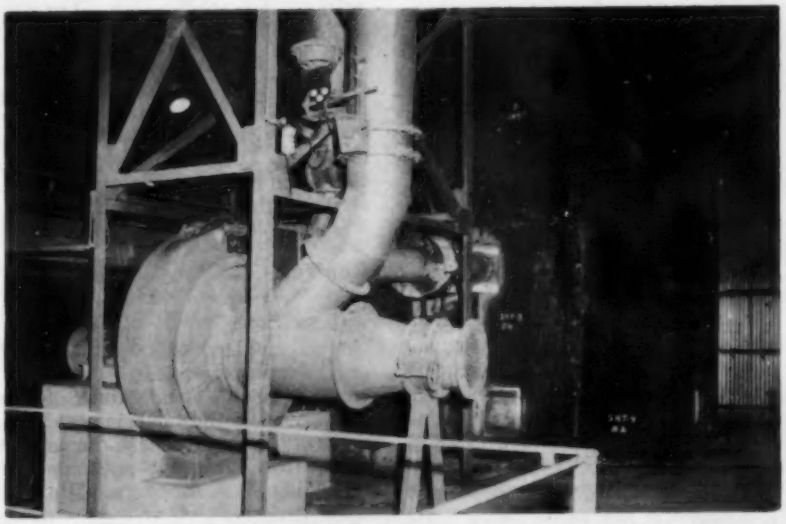
rangement, the fan impeller life has been extended considerably. The coal feed fan used is an F. L. Smidth 1250 B high-pressure fan, which is V-belt driven by a 75 hp. induction motor. The newer ball mill installation is fitted with air lock vane feeder, and the tempering air for the mill is automatically controlled by a Foxboro controller and recorder which operates a Bailey positioner. A rotary air lock is used at the base of each cyclone collector in order to prevent backdraft.

Kilns Both rotary kilns are 9½- by 250-ft. all-welded steel units, the older a Traylor and the newer an F. L. Smidth. The steel shells are ¾ in. thick, except at the section where the riding rings are attached, where they are 2 in. thick. Each kiln shell has four tires (22-in. wide), which ride on pairs of 24-in. wide by 45-in. dia. water-cooled steel rollers. The kilns, which are equipped with a single thrust roller, are mounted on a pitch of ½ in. per ft. They are lined with a variety of refractory brick, beginning with 10 ft. of 70 percent alumina brick, 40 ft. of basic brick (the hot zone), 50 ft. of 70 percent alumina brick, and 150 ft. of first quality fire brick.

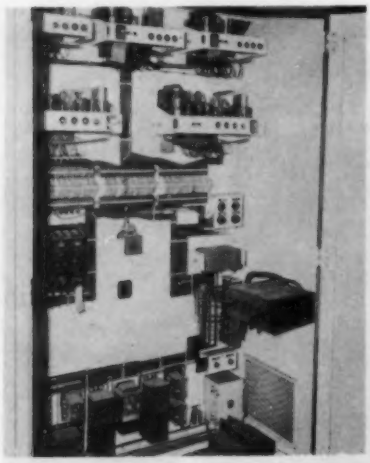
Power for the Traylor kiln drive (as well as for weighing feeders serving the kiln) is supplied by a Reliance 75 kw. motor-generator set; the kiln drive consists of a 100 hp. d.-c. variable-speed motor V-belted to a Westinghouse DH36 gear reducer, which engages the kiln pinion gear. The drive for the F. L. Smidth kiln, on the other hand, consists of an Allis-Chalmers 100 hp. squirrel cage motor, a Dynamatic 70 W water-cooled eddy-current coupling, a Westinghouse DH36 Herringbone



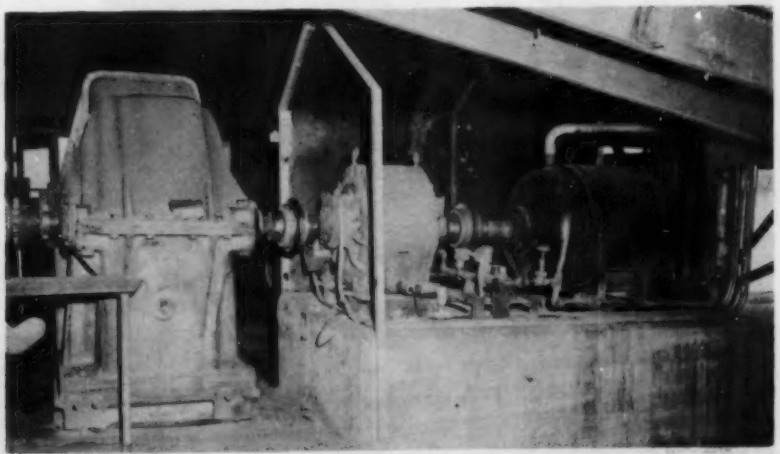
Coal for firing the kiln is pulverized to 85 percent passing 200 mesh and heated to 170 deg. F. in this 6½- by 23-ft. three-compartment air-swept mill.



Closeup of the coal feeder fan and kiln hood. Note automatically-controlled air tempering draft regulator on piping, which is used to regulate coal feed temperature.



Electronic control panel used in the operation of the eddy-current couplings for the new kiln.



The kiln drive for the newer kiln consists of a 100 hp. a.c. motor, a water-cooled eddy-current coupling, and a gear reducer. The coupling permits the use of an a.c. (constant speed) motor for providing variable-speed.

This view of the feed end shows the kiln feed belt conveyor, delivery chute, and scoop feeder; the latter is somewhat unique to the industry.

gear reducer, and a flexible coupling. Both kilns have standby gasoline engines for use in case of power failure.

This use of eddy-current couplings at the Thornton plant is believed to be new to the refractory dolomite industry, although it has already been used in the cement industry. The coupling is basically a slip device which provides infinite speed variation from a constant-speed a.-c. motor with full-torque starts; it transmits rotation from a driving to a driven member by magnetic attraction and without mechanical contact. Thus adjustable speed is obtained with a non-friction method. The device requires the generation of eddy currents, the intensity of which directly affect the torque produced at the output shaft; these eddy currents are generated by exciting the field coil of the coupling with a small amount of direct current, which is obtained through a small electronic control unit fed directly by alternating current. Consequently alternating current alone is used to power this adjustable-speed drive. By eliminating the need for d.-c. motors, the coupling necessarily eliminates slip ring and commutator trouble inherent in d.-c. motors. However, the principal advantages of the device lie in providing infinite variations of output speed as well as accurate speed control. In addition, the device absorbs torsional impulses, dampens vibrations, and permits almost instantaneous response as well as gradual acceleration of loads.

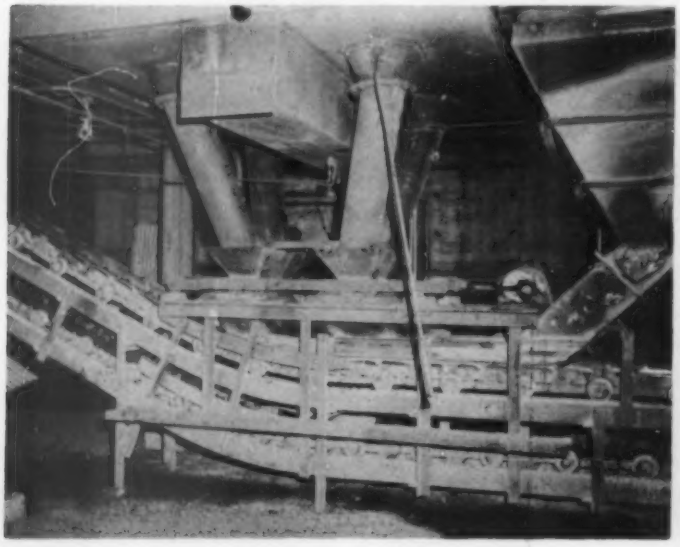
Kiln gases from each kiln are exhausted through a 75-ft. high steel stack by an F. L. Smidth No. 45 draft fan, having a capacity of 95,000 c.f.m.; the fan is V-belt driven by a 100 hp. induction motor. In leaving the kiln the gases first pass through a fire-brick lined dust chamber and then through unlined steel ductwork. The latter is fitted with an F. L. Smidth louvre damper, which regulates the draft through the kiln; it is controlled from the burner floor.

Controls The two kilns and allied equipment are provided with various types of automatic controls and recording devices, which are centralized on the master kiln control panels. Temperature of the kiln lining in the hot zone is measured with a Ray-o-tube and recorded on a strip chart; it approximates 3,000 deg. F. A thermocouple measures the exit gas temperature, which is also recorded; this temperature averages 1,200 deg. F. The temperature of the coal outlet and the exhaust gas through the induced draft fan are also measured and recorded; the latter temperature is kept under 600 deg. F. by means of a tempering air damper located in the duct work ahead of the fan. The kiln speed and coal mill and coal piping draft are also recorded. Finally there are gauges indicating kiln speeds, louvre damper position, and kiln hood draft, and also ammeters for the motors driving the kilns, induced draft fans, cooler fans, and coal mills. Indicating lights are also present for the individual motors.

This 24- by 10-in. jaw crusher reduces oversize clinker; it is operated in closed circuit with the finish screens.

As a check on the burning operation, the kiln operator makes a visual

View of the 18-in. pan conveyor receiving clinker from the contact cooler; electric vibrating feeders transfer the material from the four spouts to the conveyor.



Before being stored, the refractory dolomite granules are treated with Bunker C oil in this pug mill; one unit serves each storage tank.

inspection of the clinker many times an hour. Laboratory tests to determine the iron content of the clinker are made at least once for each shift. Complete chemical analyses are made at regular intervals so as to maintain a continuous accurate control of quality.

Cooler As mentioned earlier the Thornton plant features a new-type counterflow contact cooler, which was designed by Lee Niems, Marblehead's chief engineer. The compact unit, which is fire-brick lined and insulated in order to minimize radiation losses, is mounted directly beneath the kiln hood. The cooler features a nearly 100 percent recovery of the sensible heat from the clinker, and this air is used as secondary air for combustion; it is served by a large sized fan.

Clinker Handling An elaborate system of 18-in pan conveyors is used to transfer the cooled refractory dolomite granules to the sizing units and then to storage. The system is designed so that product from either kiln can be ultimately conveyed to any of the four storage tanks.

In the clinker-handling circuit for the older kiln, the material from the cooler is fed to a pan conveyor via Syntron vibrating feeders (reciprocating feeders are used on the other cooler); then the material is screened on a Hewitt-Robins 2- by 6-ft. single-deck screen, fitted with ⅜-in. opening cloth. The throughs, representing finished product, are then conveyed to a bucket elevator, then to a pair of pug mills for oiling, and finally to storage. Oversize from the screen joins with the cooler product of the second kiln and is conveyed on one or both of two paralleling inclined conveyors to a pair of 2- by 6-ft. Hewitt-Robins single-deck screens, also fitted with ⅜-in. cloth. Oversize material is then chuted to an Allis-Chalmers 2410 jaw crusher, which is V-belt driven by a 25-hp. motor; the crusher is operated in closed circuit with the screen, the return of the crusher product being effected by a bucket elevator. The finished product from the screens is then conveyed through a tunnel to a bucket elevator leading to a second pair of pug mills ahead of the other storage bins. The quartet of pug mills are mounted on top of the storage tanks; each is a 12-in. by 20-ft. unit in which the refractory granules are thoroughly treated with Bunker Coil in order to retard slaking, reduce the dust, and improve the appearance of the finished product. Like the raw-material storage tanks, the finish product

Wallace E. Wing, president, Marblehead Lime Company.

tanks are of all-welded steel construction. The four tanks, having combined capacity of approximately 2,400 tons, are mounted in a row over a single track; this arrangement facilitates loading into the covered hopper and container cars. The tanks are emptied through air-operated spouts.

In the event rejected material is produced, provision is made to handle this material at the screening department; it is conveyed from the screens by a bucket elevator to a rejects storage tank for disposition.

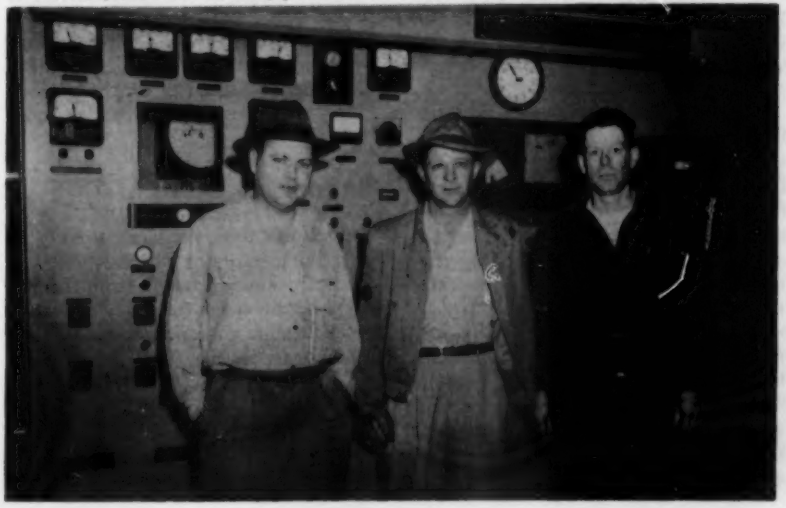
Credits The Thornton refractory dolomite plant was designed by John F. Meissner Engineers, Inc., and built under the supervision of George M. Lenzie and Harry Achim, Material Service vice-president and construction superintendent, respectively. A glance at the accompanying aerial view shows the plant is almost completely under cover, including the kiln drives. This particular covered area was made especially large in order to provide ample space for refractory brick storage and for shop work. A man elevator was installed to serve the finish storage tanks; a similar elevator will soon be built to serve the raw material storage tanks. In this latest construction program the company has also built a new and modern office, as well as adjoining shower and locker facilities for the employees of both the refractory dolomite plant and the hydrate plant.

The Thornton refractory dolomite plant is one of six Marblehead plants, the others being located in Thornton (hydrate plant), South Chicago, Quincy, and Marblehead, Ill., and Hannibal, Mo. Rotary lime kilns are used at South Chicago and Thornton, while the Marblehead and Hannibal plants utilize shaft kilns. An underground mining operation at Quincy, Ill., produces high-calcium limestone for the Marblehead plant nearby. Another underground mine at Hannibal supplies the Hannibal lime plant with high-calcium limestone.

C. C. Addams is production manager of company's six plants; his office is at Thornton. J. E. Jackson is plant superintendent of Marblehead's two plants at Thornton, and John Lanham is plant foreman of refractory dolomite plant.

The executive officers of Marblehead Lime Co. include Col. Henry Crown, chairman of the board; Wallace E. Wing, president; Lester Crown, vice-president; M. R. Mathews, vice-president, and Irving Crown, secretary. Marblehead's main office is located at 300 W. Washington Blvd., Chicago.

Key operating personnel include Cy Addams, new production manager of Marblehead's six plants; Jim Jackson, superintendent of both the refractory dolomite and hydrate lime plant at Thornton; and John Lanham, plant foreman of the refractory dolomite plant.



Edwards Air Base

(From page 193.)

sary, a Cedarapids rinsing screen above the loading station can be used before the aggregates drop to the loading bins.

Steady production is a "must" at the plant in order to keep pace with the construction schedules; and the contractors specified equipment which their long experience indicated would be able to maintain the day-after-day grueling pace during the life of the contract. In addition to its primary job of supplying the Edwards project, the plant also furnishes the aggregates for the big Lockheed air strip job under construction in nearby Palmdale; it is estimated that more than 1,000,000 tons of finished aggregates will be required for the two jobs!

An indication of the careful planning that went into the plant may be observed in the conveyor system, which keeps all materials constantly on the move. Yuba-Shrock motorized head-pulleys were specified for all above-ground belt conveyors. These self-contained pulleys have their motors and reduction gears built inside the steel pulley shells. Driving equipment is held stationary by torque arms attached to the conveyor frames, thus protecting motors and moving parts against dust, dirt and the weather. Seven of these self-contained units drive the stackers and the intra-plant belt conveyors.

Belting between the portable plant and the primary crusher and washing tower is 30 in. wide; 24-in. belts are used on the stackers, while the tunnel-recovery system uses 36-in. belts. The conveyors were fabricated by the Conveyor Co., Los Angeles.

The batch plant is a Noble fully-automatic installation. The aggregate trucks dump to a hopper feeding a radial conveyor which builds up piles over a tunnel for recovery to the batch-plant bins. A Symons screen re-grades the coarse aggregates at the batch plant.

Paving operations are carried on by Koehring and Multi-Foote units working in parallel and laying 25-ft. wide strips between Heltzel steel forms. Specifications call for the concrete to attain a flexural strength of 550 lb. in 14 days. Including the taxiways and aprons, total concrete requirements at the Edwards project will be about 400,000 cu. yd. The project is scheduled for completion late this year. The airstrip, nearly 3 miles long, is almost level for this entire distance. Actually, however, there is a slight grade of 0.14 percent for drainage purposes.

Col. Arthur H. Frye Jr. is district engineer for the Corps of Engineers, and George P. Davis is project engineer. D. Gerald Bing is the project manager for Twaits, Morrison-Knudsen & Westbrook; and Clem Marchant is the aggregate plant superintendent.

National Lime Ass'n.

(From page 174.)

its relation to business, by Edward F. Howrey, chairman of the F. T. C. He said that the F. T. C. has an almost unbelievable scope of jurisdiction as it regulates the competitive practices of all business. Of its general statutes the basic one prohibits unfair practices of any kind. This body, he said, is now investigating health and accident insurance companies to see if their advertising is misleading. A coffee investigation is also under way on which at least a report will be made.

In all investigations, said Mr. Howrey, great care is exercised as the Commission has life and death powers over business. Steps are never taken beyond the intention of laws passed by Congress but the three basic governing laws have some inconsistencies which the Robinson-Patman act was intended to reconcile. The Department of Justice, he said, is charged with the responsibility of prosecuting cases. The F. T. C. is an administrative and regulatory agency which tries to stop practices before they reach the point where prosecution is necessary. It has in its employ lawyers, statisticians, economists, and other specialists, and also seeks expert outside advice. It is, he said, a bureau of consultation, and business, especially small business, is invited to ask for advice to increase compliance with the law. Mr. Howrey explained that at one time very little was done about compliance but procedures have been simplified and results are already evident. Plans are to concentrate on the hard core cases direct instead of on the peripheral test cases which benefit only the lawyers.

Report on Labor

(From page 194.)

negotiators took pride in their skill in striking bargains which were good for both sides, rather than in forcing their counterparts to give in.

5. It should be noted that negotiations were always marked by a specific awareness by the union of its responsibility to the membership. The techniques by which this sense of responsibility was introduced into the negotiating sessions varied widely. At one extreme, there was the "goldfish bowl" bargaining which permitted the membership to have large numbers of representatives attend negotiations. At the opposite extreme, perhaps, was the situation in which the members were simply asked to accept or reject a tentative agreement as a whole. In virtually all of the cases, however, the rank and file were brought in on the negotiations. Management and union leaders alike were made aware that they bargained not for themselves alone, but for the whole worker group. This meant, in turn, that the hard-won results of several days of negotiating were very seldom lost through subsequent rejection by a dissatisfied membership.

Secretary Weeks Praises New Federal-Aid Highway Act

The following statement by Secretary of Commerce Sinclair Weeks points up the importance to the nation of the recent Federal Highway Aid appropriations:

"The signing by the President of the new Federal-Aid Highway Act of 1954, authorizing a two-year total of $1,932,000,000, starts the Bureau of Public Roads, Commerce Department, on the largest federal highway program on record.

"The provision of $875 million for apportionment among the states for each of the fiscal years beginning in 1955-56 will make possible the biggest federal highway program in history to improve the national highway system, reduce traffic congestion, strengthen national defense, expand research in road improvements, and increase the comfort, convenience and safety of the users of the nation's 56,000,000 motor vehicles."

He cites three highly beneficial effects of the act: (1) federal funds, with state matching money, will make possible the improvement and modernization of some 40,000 miles of highway; (2) expenditure of the funds will be a definite impetus to our economy, which should be stimulated in business activity and employment; (3) the Administration's action will encourage the states to enlarge programs independent of federal aid, and will result in increased activity by private capital in connection with assured highway improvements.

Superior Portland Cement Company, Inc., reported a 1953 income of 1,275,848 ($4.70 a share); the 1952 figure was $1,334,038 ($4.06 a share). The net profit of $639,078 in 1953 topped the previous year's figure by $86,986.

personal mention

Harbison-Walker Refractories Company officials have announced the appointment of C. A. BRASHARES as general sales manager.

C. A. Brashares

Mr. Brashares, who has served as assistant general sales manager since September, 1953, joined Harbison-Walker in 1928 after his graduation from Case Institute of Technology. He spent a number of years in the research department and then transferred to technical sales as a sales engineer. He became district sales manager in Birmingham, Ala., in 1948. His contributions to the technical literature of the industry have been numerous and of great importance.

MILTON F. MASTERS, specialist in highway construction engineering, was recently appointed executive assistant to Jake Will, president of the Southern Pacific Milling Company, Santa Barbara, Calif. He will be primarily concerned with the supervision of all branch operations of the company.

COL. HENRY CROWN, chairman of Material Service Corporation, Chicago, has been appointed to the De Paul University board of lay trustees.

Purpose of the board, which was formed in 1946, is to serve in an advisory capacity to the president and with university officers to develop short- and long-range building and educational programs and formulate plans for financing such developments.

MELVIN H. BAKER, chairman of the board of National Gypsum Company, was elected a director of the U. S. Chamber of Commerce, representing the national chamber's department of manufacture at the recent 42nd annual meeting in Washington, D. C.

Appointment of JAMES T. LORDITCH and THOMAS HEARON as sales representatives has been announced by officials of the Zonolite Company, Chicago, vermiculite producers.

Mr. Lorditch, formerly in the general contracting field, will serve customers in the central Pennsylvania area. A graduate civil engineer formerly with a Shreveport, La., general contractor, Mr. Hearon, will represent Zonolite in south Arkansas and central Louisiana.

CHRISTIAN F. BEUKEMA has been appointed vice-president of the Michigan Limestone Division of the U. S. Steel Corporation. For the last year Mr. Beukema was general manager of operations of this division.

SAVE MONEY ON YOUR LOADING DOCK!

POWER-CURVE LOADER CUTS COSTS

This Power-Curve Loader curves in any direction while under power. Swing it left or right, up or down. Conveys bags around corners, into boxcars or trucks.

Eliminates hand trucking; reduces loading crews to 1 or 2 men, for 12 to 30 bags per minute.

- Self-propelled
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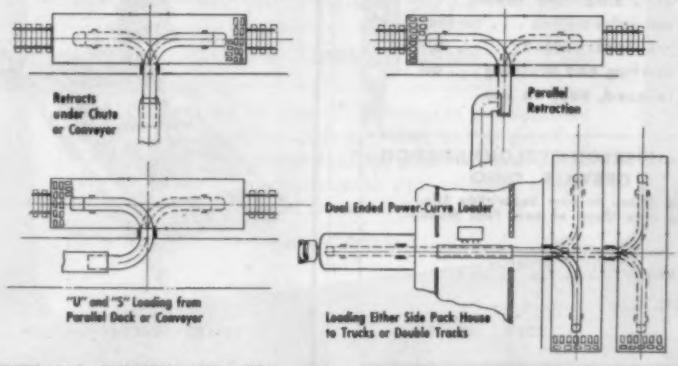
"POWER AROUND THE CURVE — WHERE YOU NEED IT."

MADE ANY LENGTH OR HEIGHT: FITS ANY LOADING SITUATION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CABLE DRILLS AND TOOLS

J. E. Hittle

The following appointments on the staff of the Asphalt Institute were recently announced: JEAN E. HITTLE has been named assistant engineer of research, with headquarters at the institute's national headquarters in New York. Mr. Hittle fills a post newly authorized by the institute's board of directors as a part of its expanding engineering-development program. For the last three years he has been materials engineer with the New Mexico State Highway Department.

ROBERT B. MCKEAGNEY was appointed district engineer for the New England area, with offices in Boston. He succeeds EDWARD M. HOWARD, whose new territory includes Arkansas, Illinois, Missouri, and Wisconsin. Mr. Howard's headquarters are in Springfield, Ill. Before joining the Asphalt Institute Mr. McKeagney served with the U. S. Army as a geologist, a specialist in paving materials, and an adviser.

DILLARD D. WOODSON, formerly of the Virginia Department of Highways, is now district engineer for Alabama, Florida, Georgia, South Carolina, and Tennessee. His headquarters are in Atlanta. Mr. Woodson was assistant testing engineer with the Virginia Department of Highways from 1951 until his appointment to his present post.

WILLIAM T. YOUNG was recently appointed manager of masonry sales of the Huron Portland Cement Company, according to a statement by Clarence L. Laude, vice-president in charge of sales. Mr. Young has been with Huron Portland since 1949.

WALTER A. WECKER, president of Marquette Cement Manufacturing Company, Chicago, Ill., has been elected a director of Poor & Company, Chicago railway supply manufacturer. He fills the vacancy occasioned by the death of the former chairman, Fred A. Poor, last August.

A. T. HERSEY has assumed a new post with the Alpha Cement Company at its home office in Easton, Pa., as director of technical service to succeed J. G. BRAGG, who will retire in September. Mr. Hersey previously served as a field engineer in charge of the company's western division.

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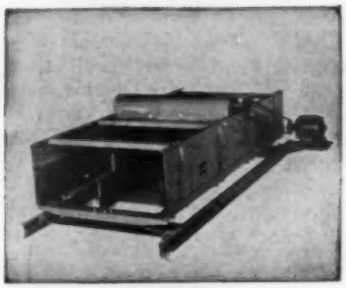
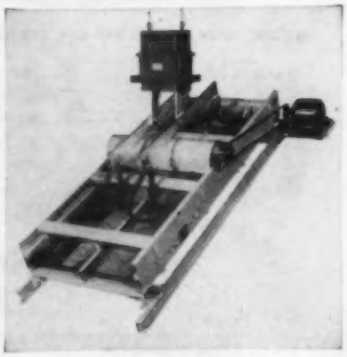


Type "MR" 42" x 96" 2-deck



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RACINE — WISCONSIN

H. H. Bein

HUGH H. BEIN has been named manager of the Del Monte sand plant of the Del Monte Properties Company, Pebble Beach, Calif., according to S. F. B. Morse, president. Mr. Bein succeeds the late William E. Messner in the post of manager.

Mr. Bein, who has had many years of experience in mining, milling, and geological work, attended the Colorado School of Mines and is a graduate of the University of Wyoming. He spent three years in the Philippines, worked a year and a half in Colorado with the Atomic Energy Commission, and comes to the Del Monte sand plant from the American Cyanamid Company, which is operating a research laboratory for the A. E. C. with headquarters in Winchester, Mass.

CHARLES M. EVERHART, a member of the Tennessee Senate during the last three sessions of the General Assembly, has accepted a position as assistant to R. N. Coolidge, executive vice-president and general manager of the Cumberland River Sand Company, Nashville, Tenn.

C. GLENN BROWNING, vice-president and general sales manager of the Lehigh Portland Cement Company, Allentown, Pa., has been named to the board of directors. Mr. Browning has served in various capacities at Lehigh Portland since joining the firm in 1921. He was appointed assistant eastern sales manager in 1938 and promoted to sales manager five years later.

EDWARD J. BALF has been elected to the presidency of the Edward Balf Company, Hartford, Conn., succeeding ERNEST R. MOLT, who becomes chairman of the board. Mr. Balf joined the staff of the firm in 1931 and will continue in the position of treasurer which he has held since 1949.

GEORGE A. MEIHAUS, vice-president of the Fort Worth Sand & Gravel Company, Fort Worth, Tex., has been elected to serve as senior vice-chairman of the Fort Worth chapter of the Texas Manufacturers.

JERRY JANKOVIC, formerly plant engineer at Kelley Island Lime & Transport Co.'s Buffalo plant, has been named assistant superintendent of that plant.

More "CRUSHING" FACTS ON American CRUSHER PERFORMANCE

FOUR American CRUSHER INSTALLATIONS BY TEXAS QUARRY . . . PROVE THAT *Americans* REALLY PAY OFF!

Four in a row! Yes, since 1936, this southwestern quarry has turned to American each time its operations called for expanded production.
To date, nearly five million tons of limestone have been reduced by these four crushers. Here are the individual performance records:

TYPE	30-40	30-40	30-40	AC-5-4
Age	14½ yrs.	9 yrs.	5½ yrs.	5½ yrs.
TOTAL TONNAGE	2,175,000	1,350,000	605,000	2,337,500

Each crusher had to pay off in tangible productivity to justify three repeat orders. What better proof of American Crusher dependability, efficiency and economy? Let American investigate your crushing needs. It will make dollars and sense.

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Simple, easy to operate. Time and Speed can be controlled to meet requirements of any sieve analysis. Operate on ordinary 110 volt, a-c.

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H. R. BARKER has been named plant manager of the Lone Star Sulphur Corporation's newly-constructed plant at Long Point Dome in Fort Bend County, Texas.

J. E. WESTENBERG has been named chief engineer and manager of the company. He has supervised the construction of refining and chemical plants in the Houston sector and in such distant areas as Lebanon and England.

J. P. VAN GELDER has been appointed Oakland (Calif.) district manager for United States Gypsum Company. He replaces R. T. MORRIS, who has been transferred to the company's Central Pacific Division.

VICTOR E. COLE has been appointed assistant to Claude E. Harper, vice-president and general manager of Kaiser Gypsum Company, Inc., Oakland, Calif.

Mr. Cole will act in an executive capacity in the co-ordination of the various operations of Kaiser Gypsum, including sales, production, and construction. He was assistant operating manager prior to his present appointment, and has been associated with the Kaiser organization since 1941.

Irving Crown, executive vice-president of Material Service Corporation of Chicago, has announced two new executive appointments.

THEODORE THORNTON has been named chief maintenance engineer, and JOHN P. DRANEY JR. has been assigned manager of Chicago yard operations.

Mr. Thornton was construction manager and maintenance engineer for United States Gypsum Company plants for the last 14 years. He will have charge of all equipment and maintenance and machine shops throughout the company's properties.

Mr. Draney will supervise all the company's yard operations, which include handling and delivery of all building materials, including ready-mixed concrete.

Appointment of GEORGE J. WACHHOLZ as controller was announced recently by the Minnesota Mining & Manufacturing Company. Mr. Wachholz joined 3M in 1936 as a cost accountant and was later made division controller. In 1950 he was appointed assistant controller.

WALTER H. GAITHER JR. was recently appointed manager of the Green Bag Cement Division of the Pittsburgh Coke & Chemical Company, Pittsburgh, Pa. He succeeds ADAM J. MILLER, who retired from this post. Mr. Miller had been serving as Green Bag Cement Division manager since 1929.

Recent changes announced in the personnel of the Kelley Island Lime and Transport Company, Cleveland, Ohio, are as follows:

N. D. SHAFER, formerly superintendent of the firm's Marblehead (Ohio) plant, was appointed general manager of the Presque Isle Corporation. He will be in charge of the new fluxstone operation now under construction near Alpena, Mich. Kelley Island Lime and Transport will be the operating agent for the Presque Isle Corporation.

CHARLES E. WALMSLEY has been promoted to the post of superintendent of the Marblehead plant, replacing Mr. Shafer. Mr. Walmsley has been with the company since 1923 in various locations, most recently at Marblehead as assistant superintendent.

FRANK E. MCCASLIN, president of the Oregon Portland Cement Company, Portland, Oreg., was recently re-elected a director of the Chamber of Commerce of the United States, Tenth District.

Extra N.& F. Silo assures against coal shortage

To avoid running out of coal in the event of delivery failure, a Michigan manufacturer had us erect two 18 x 60 ft. silos. One of them is kept filled with a reserve supply of 381 tons. Then, if trains or trucks become snowbound, the plant doesn't have to shut down as had frequently happened in the past.

This is a splendid idea for users of all kinds of flowable bulk materials—extra storage space for emergencies. The additional cost is trivial in relation to the loss occasioned by work stoppage.

And, of course, Neff & Fry Silos are the storage bins to use on account of their many advantages.

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Descriptive literature is yours for the asking. You won't be subjected to personal solicitation by requesting literature.

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NEFF & FRY SUPER-CONCRETE STAVE STORAGE BINS

B. B. COUNTRYMAN was recently named vice-president, purchasing division, and I. R. HANSEN, assistant treasurer of Minnesota Mining & Manufacturing Co.

Mr. Countryman joined 3M as purchasing agent in 1928 and has been director of purchases since 1942. He has been active in the National Association of Purchasing Agents during his 26 years with 3M.

Mr. Hansen joined 3M in 1943 as assistant controller in charge of the internal auditing department.

DR. WILLIAM ALFRED LALONDE JR. was elected vice-president and will continue as manager of research and development of the Pennsylvania Salt Manufacturing Company. EDWARD F. BEALE, treasurer of the company, was also named a vice-president.

Dr. LaLonde, a graduate of the University of Pennsylvania, joined Pennsalt in 1944, and has been directing Pennsalt's research and development program at Wyndmoor, Pa., since 1948. From 1927-37 he served as a member of the faculty of the University of Pennsylvania and during the following years, did post-doctoral work in organic chemistry at the Swiss Federal Polytechnic Institute in Zurich. From 1938 to 1944 he was director of research and development for the Attapulgus Clay Company, Attapulgus, Ga.

Mr. Beale attended the William Penn Charter School and is an alumnus of Princeton University. Following separation from the military service in 1946 he joined Pennsalt as assistant to the treasurer and was named controller in 1948 and secretary-treasurer in 1951.

LEROY CARRIER, general traffic manager of Universal Atlas Cement Company, New York, is retiring after 36 years of service. He will be succeeded by JOHN H. DENT, previously assistant general traffic manager.

J. B. EMMONS, has been named manager of the Pacific industrial district, for the United States Gypsum Company, with headquarters in Los Angeles.

G. & W. H. Corson, Inc., lime and limestone firm of Plymouth Meeting, Pa., has purchased a 316-acre tract in Whitemarsh Township for $320,000. Some of the southern acreage of the tract is underlaid with limestone and is bounded on the southeast by other land belonging to the Corson firm.

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AFCO "IC" (improved carbon) FORGED STEEL GRINDING BALLS

Forged from AFCO's new improved carbon steel, AFCO "IC" deep hardened grinding balls offer deep, penetrating hardness comparable to many types of costly alloy balls—yet they are priced competitively with media forged from ordinary carbon steel.

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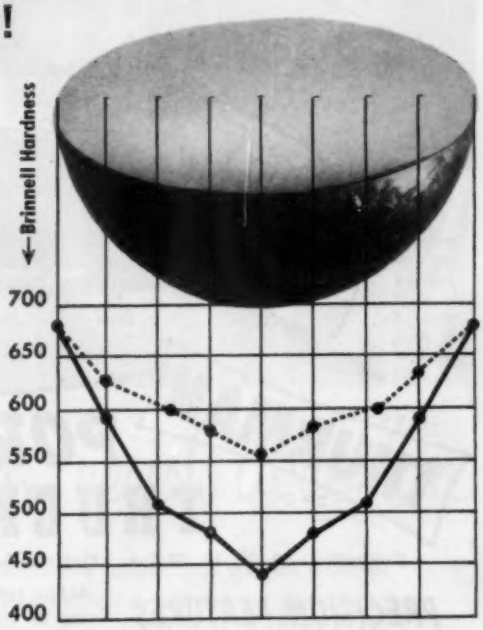
Here are hardness curves developed from actual tests on AFCO "IC" deep-hardened 4" ball (solid line), and a 4" alloy ball (dotted line). Note how the AFCO "IC" gives you such alloy-type characteristics as high average volumetric hardness and deep penetration with a "tough" center—at substantial savings in cost.



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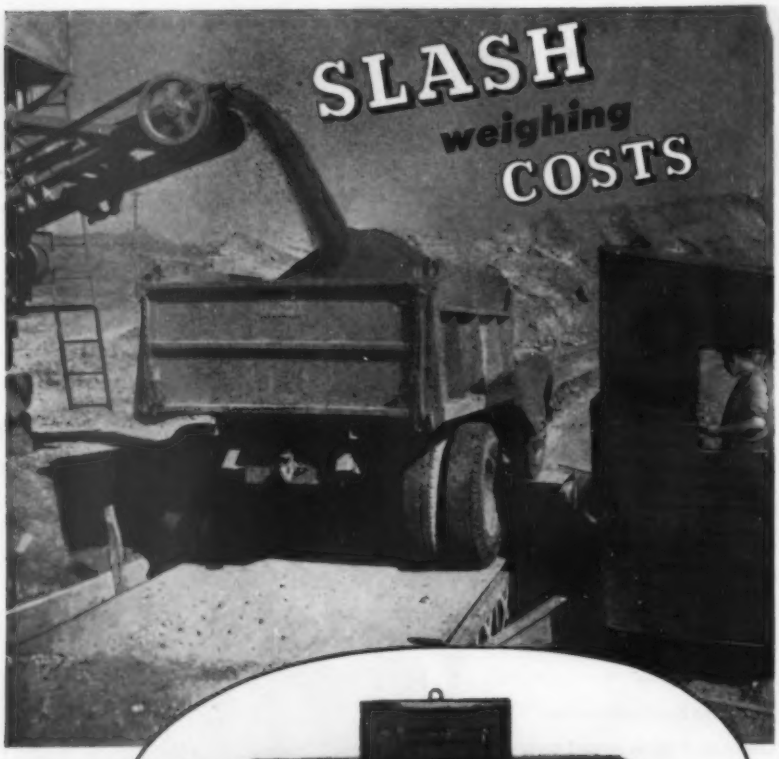

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PRECISION FEATURES

- Balanced Solid Steel Deck
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SLASH THE COST of "on-the-job" weighing by eliminating expensive scale pits. The Thurman Portable Truck Scale, now in use across the nation, needs no pit. It provides accurate and precise weighing on any flat terrain. Gravel or earth serves as a ramp. To move, just remove 6 bolts which hold side arms. The complete scale is then lifted as a unit. Once positioned it can be ready for use in minutes.

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Obituaries

DOMINIC RACIS, also known as DAVID RODGERS, died unexpectedly after a heart attack on May 23. He was superintendent at the United States Gypsum Company's Jersey City, N. J., operation.

FRED C. WOLF, 78, who served for 43 years as quarry superintendent and vice-president of the Waukesha Lime & Stone Company, Waukesha, Wis., died at his home in that city on April 5 after a week's illness. In 1948 Mr. Wolf and his sons, Clarence and Lloyd, organized the Quality Limestone Products Company at Sussex, Wis., of which he was vice-president. Illness three years ago forced him to retire from active work.

A. D. LAWRENCE JEWETT II, retired vice-president and director of the New York Trap Rock Corp., died on May 11 at a hospital in Englewood, N. J. Mr. Jewett joined New York Trap Rock after serving in the Navy in World War I. He was 66 years of age.

ERNEST RAYMOND CHEEK, retired superintendent of the Dewey Portland Cement Company, Dewey, Okla., where he had been employed for 54 years, succumbed to a heart attack at his home on May 19.

DANIEL MILTON HAGER JR., 49, district sales manager for the Alpha Portland Cement Company, Ironton, O., died at his home in Newtown on April 9.

DEWEY D. BATTJES, one of the original founders of the Grand Rapids Gravel Company, Grand Rapids, Mich., in 1920, and president of the firm during the last four years, died on May 14 of a heart ailment at the age of 58 years. Mr. Battjes was also president of the Consumers Gravel Company and the Lamar Oil Company.

H. VERNON FITZ, Birmingham, Ala., assistant southern sales manager of the Alpha Portland Cement Company, died unexpectedly on May 27, after an illness of only two days. Mr. Fitz had been associated with the Birmingham district sales office of Alpha since May 1, 1928, at which time the Birmingham plant was acquired from the Phoenix Portland Cement Corporation.

PETER D. THROPP JR., 49, secretary of the Eureka Mica Mining and Milling Company of Portland, Conn., was found dead in his garage, apparently the victim of carbon monoxide fumes, on May 16 near Atsion, N. J.

JAMES W. HULEN, 73, salesman for the Lone Star Cement Corporation for 17 years until his retirement in 1945, died on June 6 at a hospital in Kansas City, Mo.

HENRY G. PFEIL, former president of the Iron City Sand Company, Pittsburgh, Pa., died on June 2 at the age of 73. Mr. Pfeil had made his home in San Diego for the last 25 years. His father, the late Philip M. Pfeil, was one of the founders of the Iron City Sand Company.

HOMER H. HARRIS, secretary-vice-president of the Potash Company of America, Carlsbad, N. M., died unexpectedly in Denver, Colo., on June 1. Mr. Harris, 70, had headed mining, banking, and lumber enterprises in Iowa and Colorado for more than 50 years.

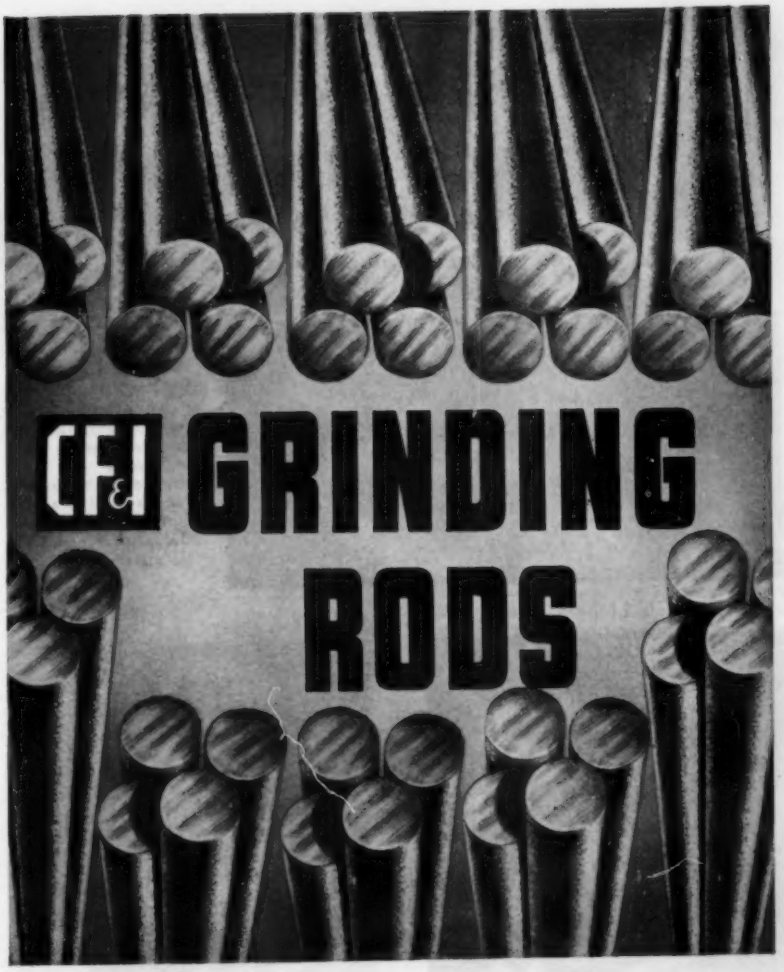
DONALD C. LEO, secretary and general attorney of the Universal Atlas Cement Company, a subsidiary of the U. S. Steel Corporation, died of a heart attack on May 22 in his home in Huntington Station, Long Island. He was 51 years old.

After several years of association with New York firms and conducting his own law office, he joined Universal Atlas as an attorney in 1943. He was appointed assistant secretary of the company in 1947, secretary in 1951, and general attorney in 1953.

RICHARD R. BALL, 69, pioneer sand-and-gravel producer at Walteria, Calif., died on April 24 while on a vacation in Arizona. He resided in Redondo Beach, where he had been prominent in civic affairs for a quarter of a century.

GILBERT G. HILL, 57, president of the Keener Gravel Co., Inc., and the Hill and Stewart Gravel Company, Dexter, Mo., died at a hospital in that city on April 15 after a long illness. Mr. Hill was a former mayor of Dexter.

Robert E. McCarthy, 79, founder and president of the R. E. McCarthy & Sons, Syracuse, N. Y., died on April 22 after a short illness. The firm which bears his name was founded in 1890.



wear evenly...resist abrasion

CF&I Grinding Rods are rolled from special analysis steel for more efficient, economical grinding. The CF&I Pueblo Plant maintains strict quality control, from ore to the finished steel product, to assure a grinding medium of top performance and value.

CF&I Steel Products for the Sand and Gravel Industry

Cal-Wic Industrial Screens Wickwire Rope
Grinding Balls Light Rails and Accessories

THE COLORADO FUEL AND IRON CORPORATION, Denver and New York
PACIFIC COAST DIVISION, Oakland

CF&I GRINDING RODS
THE COLORADO FUEL AND IRON CORPORATION

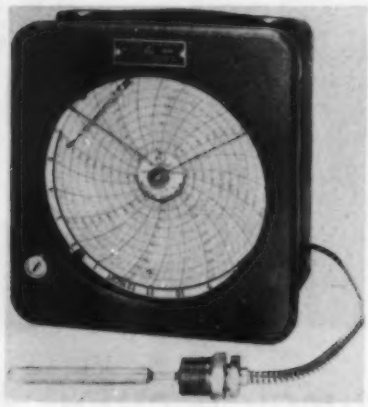
1788

New Machinery and Equipment

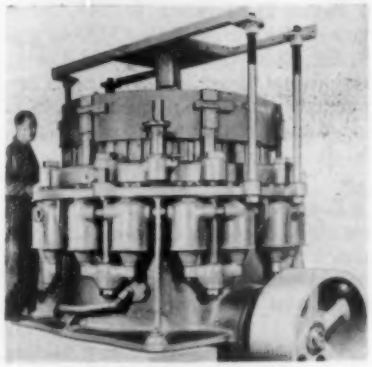
(For more information, use card on p. 223)

● Working continuously 5½ days a week for the past year and a half, this Malsbary steam cleaner has been used to clean all types of quarry and construction equipment for Standard Gravel & Surfacing of Canada, Calgary. It needs little maintenance. (51)

● Even a freight car can run over this new wire braid, heavy duty air hose without damage to the rubber hose, Goodrich says, announcing the Commander hose. Recommended for 400 psi, the wire-reinforced hose has a 10:1 safety factor. (52)



● Auto-Lite's new temperature recorder has a 6-in. clear-reading evenly-calibrated chart, an aluminum die-cast case and comes in wall or portable models. (53)

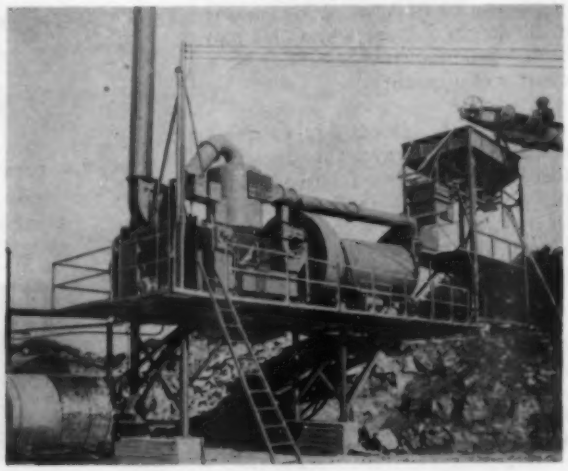


● A new method of comminution employed in this Gyradisc crusher developed by Nordberg Mfg. Co. is said to provide substantially greater tonnage of fines than heretofore obtainable. It uses the Gruendler method of reduction, alternately impacting and releasing a thick mass of material. Mixing and feeding are accomplished and controlled by the compound action of gyration and rotation of the feed distributor. Overload protection is given by a positive pneumatic release mechanism which holds the bowl structure rigidly to the main frame. The cavity need not be cleaned out when restarting after power failure. (54)

● Designed to fit a wide range of tire sizes, the Galanot Tire-Track has been introduced by Union Chain & Mfg. Co. to provide rubber-tired vehicles with traction and flotation whenever ground conditions bog down operations. The tracks are quickly installed and removed. (55)

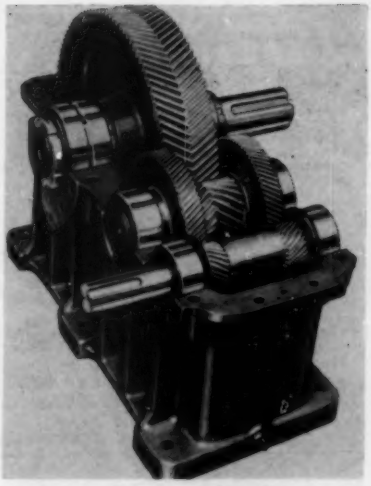
● Ease of operation (central push button controls) and controlled batch aggregate drying are among the features of this all-electric 2000 lb. capacity Speed Batch asphalt plant introduced by Universal Engineering. It will produce a production run or a single batch as required, running 25-40 tph. All units are mounted on a single frame. It can be had as a portable unit. (56)

● Built to fit standard tractors, Ateco roadbuilders (angle blade) and 4-wheel scrapers are popular in quarry road maintenance and stripping work. The blade angles right or left, and its bowl tilts 16 ins. Scrapers feature the "boiling bowl" principle, come in six sizes—4½ to 12 cu. yd. (57)



● You can handle those smaller asphalt jobs—yards, driveways, parking lots, etc.—with this new self-contained continuous flow Iowa Mfg. Co. bituminous mixing plant. It features twin-shaft mixing, can be arranged for hot or cold mix, and will deliver up to 40 tph.

(58)

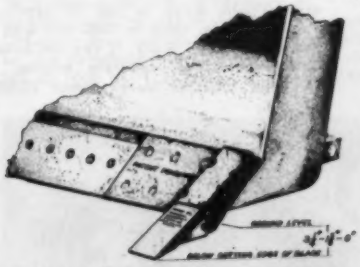


● More standard sizes and more standard ratios for every size herringbone gear speed reducers (1 to 1950 hp.) feature the expanded W. A. Jones Foundry line. Available in many types, the gears have 60 standard ratios, from 1.27:1 up to 355.8:1, and come in various assemblies for a wide versatility of drive arrangements.

(62)

● Restful and safe vision, draftless air circulation, large doors and windows, a separate adjustable driver's seat that has foam rubber and coil springs, and several other comfort features are built into the cabs of the new Model B Mack Trucks. Power and performance has been increased, and lightness and compactness maintained together with Mack's traditional rugged strength.

(59)



● More efficient bulldozer operation results from using this unique corner adapter with sharp, replaceable points, the H&L Tooth Co. reports. Bolted to the blade, the adapter-held point pilots ahead of the blade, maintaining accurate slope on cuts and cutting clearances for the dozer. Various sizes cut at ground level, 1⅝-in. and 3¼-in. depths. The heat-treated, high-alloy steel point resists abrasion and impact. Flex-pins permit quick point replacement.

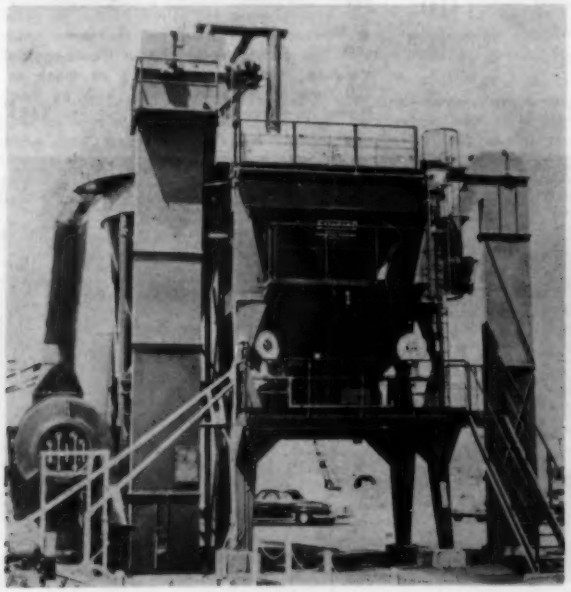
(60)

● Made in Australia under license from Standard Steel Corp. of Los Angeles, this 5000 lb. Standard RB plant (below) is the largest asphalt plant "down under". Armstrong-Holland Pty. of Sydney is building two more for other Australian users.

(61)

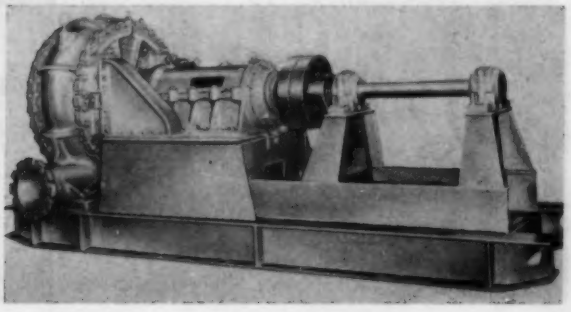
● Hand splicing of wire rope is eliminated by a new pressing system for wire rope devised in Sweden and offered here by Jones & Laughlin. An aluminum alloy sleeve squeezed around the rope in a special press "flows" into the space between the wires in the strands. Splicing time is cut, considerable rope length is saved, and several other benefits accrue.

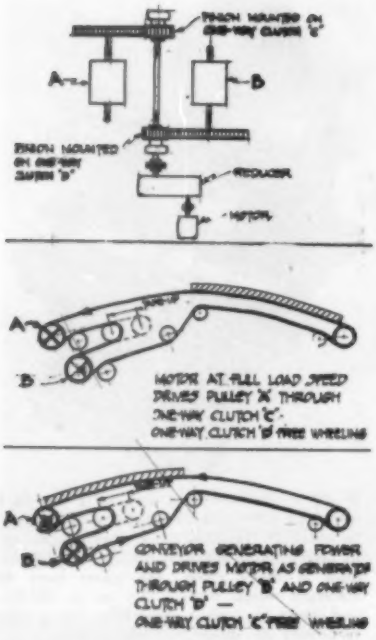
(63)



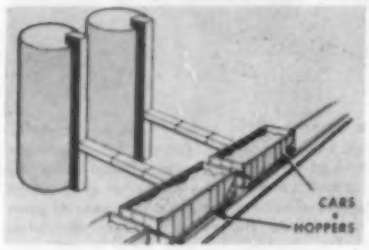
● The lower speeds and outstanding reliability of the former Morris F dredge pump and the modern hydraulic design, high heads and efficiency of the former G are combined in this new pump made in two size ranges, GA and GAF. Giant shaft design and oversize bearings, a longer wearing impeller, heavy volute casing and right-angle bracing for positive alignment under all conditions highlight the new design.

(64)

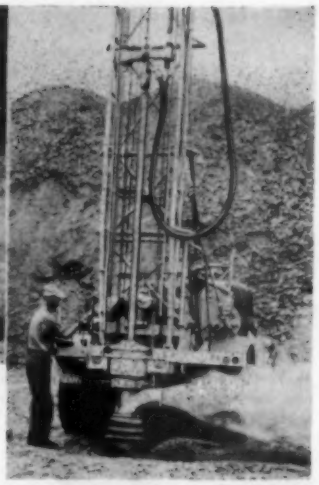



A
B
REDUCER
MOTOR
MOTOR AT FULL LOAD SPEED DRIVES PULLEY 'A' THROUGH ONE-WAY CLUTCH 'C'. ONE-WAY CLUTCH 'B' FREE WHEELING
CONVEYOR GENERATING POWER AND DRIVES MOTOR AS GENERATOR THROUGH PULLEY 'B' AND ONE-WAY CLUTCH 'D' — ONE-WAY CLUTCH 'C' FREE WHEELING

● Two Hewitt-Robins engineers have perfected this new method of braking the downhill run of conveyors on irregular terrain. A motor is attached to both a drive pulley and holdback pulley, each with a one-way clutch. The holdback pulley and its clutch take over automatically for descent, keeping the belt from running away. This cuts strain on the system, and permits the use of lighter belting. **(65)**

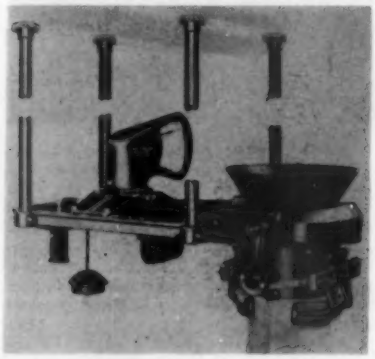


● Bin-Dicators are used to indicate level of material in the silos and control operation of the conveyors by indicating level of material in chutes and starting and stopping feed machinery as needed in this installation. They prevent choking and plugging of the enclosed flight conveyors whenever a jam occurs (left). **(68)**



● A new air-blast technique is employed in this new rotary drill for faster and more economical drilling, Davey Compressor Co. says. Designed for heavy-duty service, it drills 5⅝-in. holes to 150 ft. depths with air, and 6¼-in. holes to 1000 feet with mud. Mounted on any truck, it can be driven by power take-off or separate engine. Truck and drill together weigh about 20,000 lb. **(66)**

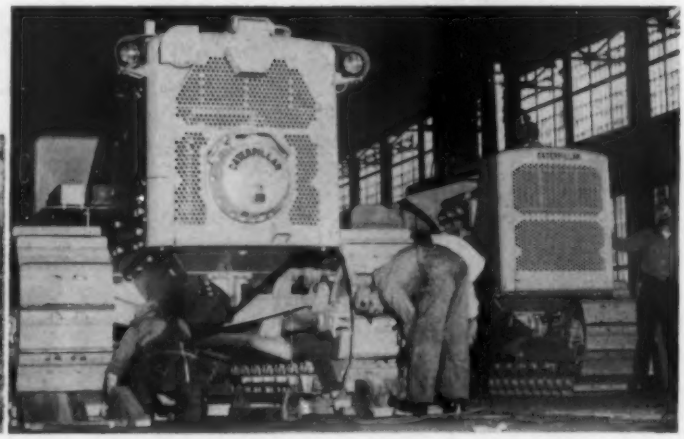
● Quick corrosion protection can be had from Shell Oil's VPI-250, a powder that can be sprayed or dusted or applied in an alcohol solution. Its vapors penetrate inside equipment and condense on internal surfaces. A VPI film need not be removed when putting storaged equipment into service (left). **(67)**

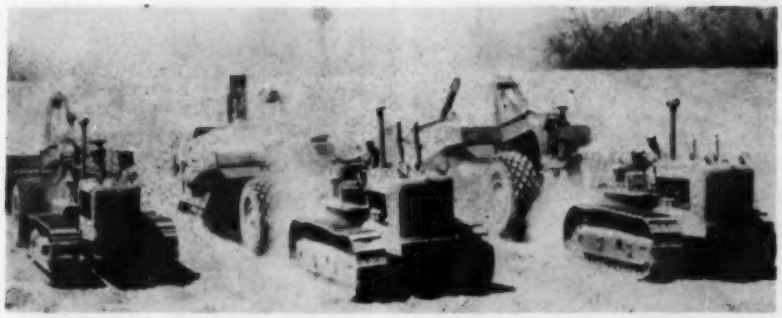


● You sack and weigh at the same time with this Exact Weight Scale Co. bagging machine. One man can bag as much as 100 tons of material a day, with no bag trimming required. **(69)**

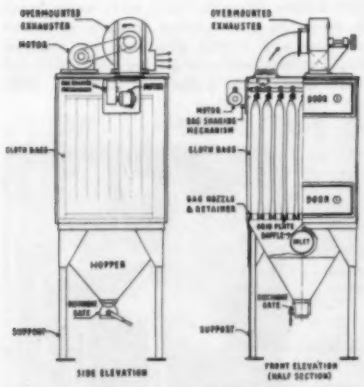
● Biggest and most powerful tractor in the world, the D9X is being job-tested by Caterpillar Tractor Co. in several areas. The mammoth weighs 51,500 without its 11,000 lb. blade and cable control. Standing 10 ft. high, 12 wide and 18 long, it dwarfs the big D8 beside it in the photo, right. **(70)**

● Below is a tiny relative, the Cat D2, recently upgraded to outperform 35-40 hp. wheel tractors. D2 now has 35 drawbar hp., 42 belt hp., and weighs 525 pounds more than heretofore. **(71)**

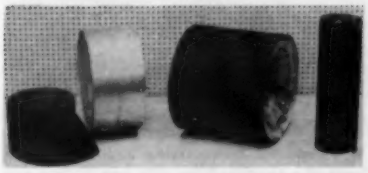




● More power is now being built into the TD-24, International Harvester's biggest tractor. Engine hp. is now rated at 190, drawbar hp. at 155. The new operating weight is 42,884 lb. and the maximum drawbar pull is 40,000 lb. Photos show two of the new TD-24's pulling 27½ and 21-yd. scrapers at the I-H desert proving grounds in Arizona. A TD-18A pulls a 14-yd. scraper at left. (72)

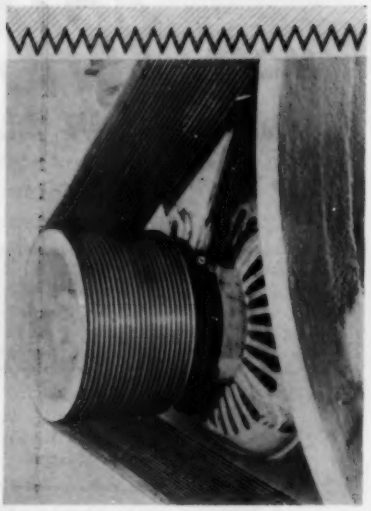


● Designed for indoor recovery of finely divided dusts in smaller volumes, this-type CN cloth bag collector is now being built by the Pangborn Corp. in seven sizes with 200 to 1000 sq. ft. cloth area (left). (74)

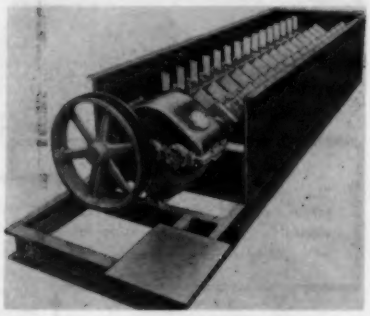


● A coating of traprock features this "Safety-Walk" waterproof, non-slip surfacing developed for pulley lagging by Minnesota Mining & Mfg. Co. The coating avoids harsh action on belts, yet provides the required traction. It comes with adhesive backing or with separate adhesive. (73)

● Crystal Silica Co. uses "gravity" flow in its screening room. Circular gyratory Sweco vibrating screens are nested on two levels to handle -10 to -60 silica sand aggregate. The firm uses 13 Swecos which need no special foundations. (75)

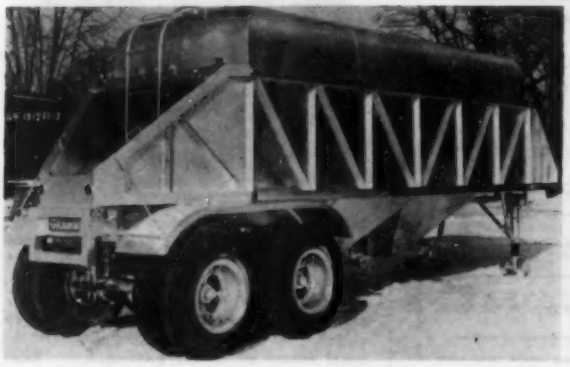


● A new power transmission concept is presented by Manhattan Rubber's Poly-V Drive. Parallel V-ribs are molded into a single wide belt and ride on sheaves grooved to mate with the V-ribs (top drawing). This results in a high percentage of belt contact, equal distribution of the load over the entire driving surface, and 50% more hp with the same width sheave. (76)

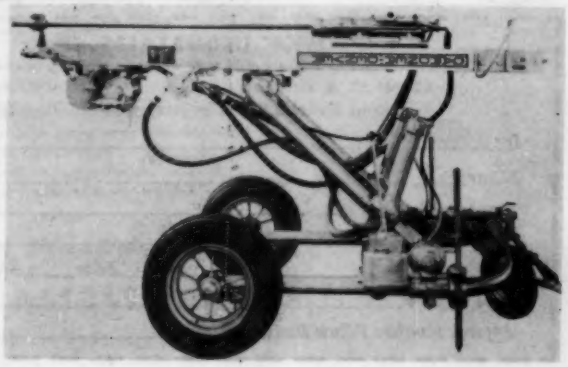


● Designed for mixing liquids and fine materials, this McLanahan Hydro Blender has two 12-ft. long paddle shafts which revolve in opposite directions, blending materials by upward, backward and forward motions. It is built in two sizes with 6 or 8-in. square paddle shafts. (77)

● Lightweight aluminum and steel tubing semi-trailers are being built by Gramm Trailer Co. for use as combination bottom hopper dump and screw-type rear discharge unit. The unit shown has Enterprise car discharge valves for handling bulk cement, etc. Capacities range from 600 to 1100 cu. ft. with two or more discharge gates. (78)



● Hydraulic lifts for the U-bar, a single drill control, and the ability to save deep holes that might otherwise be lost in broken ground are features of Gardner-Denver's new URM 4-in. wagon drill. It accommodates 8-ft. steel changes as standard and combines fast and powerful hammer action with the ability to keep the steel rotating in bad ground. (79)



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Let your SKF *Authorized Distributor* show you the "SY" Unit Pillow Block—the *one* that offers *all* the easy-maintenance features you've wished for.

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ROTATING FLINGER

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on standard shafting. Just *slide* unit on shaft to proper location, and tighten 2 set screws. Tests prove this locking device withstands vibration. Spherical outer ring compensates for initial misalignment.

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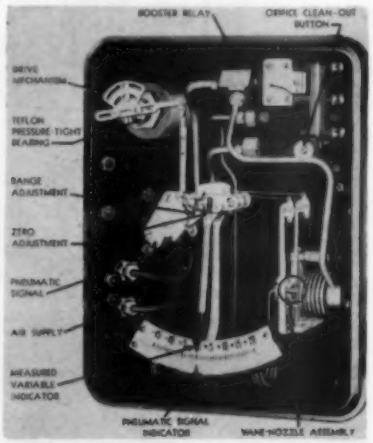
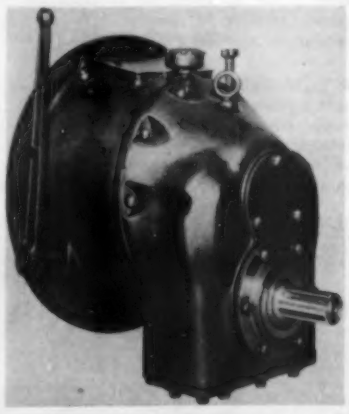
● Engineered to provide the most practical combination of long life and braking effectiveness at lower per-mile cost, this new Grizzly Silvertip heavy duty brake block is made by an exclusive formula with new molding and curing processes for superior heat-resisting and non-glazing properties and imperviousness to water and moisture. **(80)**



● Pneumatic telemetering and control systems are simplified by this new Bailey unit for transmitting measurements of flow, level, pressure, temperature, draft, differential and vacuum. It transmits 1000 feet to receivers, 400 feet to controllers. **(81)**



● Herringbone reduction gears designed especially for continuous heavy duty operation and transmission of full power from engine to load with all types of engines (40 to 155 hp) are offered by Snow-Nabstedt in two new models with power cut-off clutch. The design is said to eliminate the usual thrust of helical gearing. **(82)**

Legal Decisions

By LEO T. PARKER
Attorney at Law
Cincinnati, Ohio

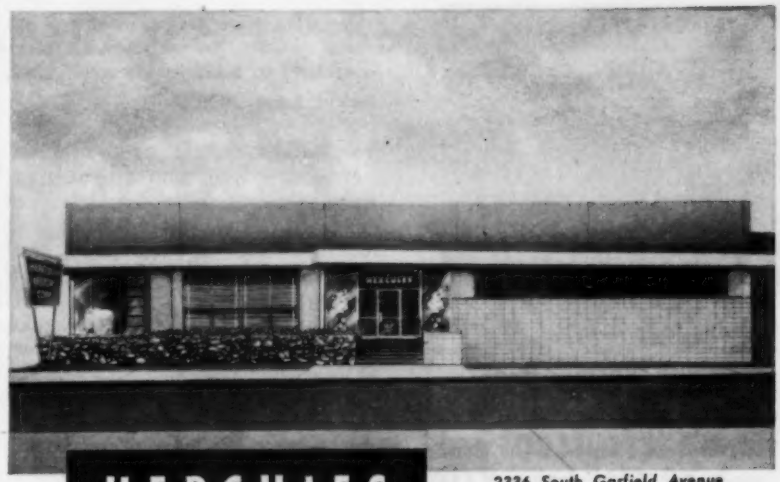
Seller of Dynamite Not Liable

Considerable discussion has arisen from time to time over the legal question: Under what circumstances is a seller of dynamite liable in damages for injuries sustained by a purchaser?

According to a late higher court decision, the seller is liable only when the evidence proves that he was indifferent to injuries likely to be sustained by the purchaser, or the seller actually knew that purchaser would suffer injuries.

For illustration, in *Flint Explosive Company v. Edwards,* 71 S. E. (2d) 747, it was shown that one Edwards purchased from the Flint Explosive Company one case containing 100 sticks of dynamite, 100 dynamite caps and 100 feet of fuse. Edwards was not experienced in the use of dynamite, and a representative of the seller instructed him in the customary and ordinary use of the explosives. After the instructions given him Edwards exploded ten sticks of dynamite. He "at the time and place aforesaid" cut off a foot of fuse, inserted one end of the fuse in the cap, and inserted the cap in a stick of dynamite in which he had punched a hole as instructed. Edwards struck a match and applied it to the end of the fuse, whereupon the spark passed immediately from the ignited end of the fuse to the cap and there was an instantaneous explosion of the dynamite, blowing off Edward's right arm and wounding him in other places. He sued the seller for heavy damages, contending that the seller was liable because its representative had instructed him in the use of the dynamite and fuses which caused his injuries.

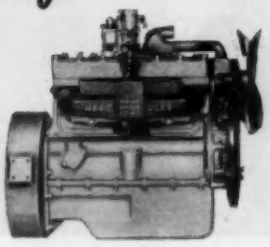
Although the lower court held Edward entitled to recover damages, the higher court reversed the verdict, saying: "There was no evidence that the employees and officers of Flint Explosive Company did not know the correct procedure for selling, handling, and exploding dynamite, or that Flint was selling and giving erroneous instructions as to how to explode it. In short, the evidence does not show a conscious indiffer-



HERCULES

2336 South Garfield Avenue
Los Angeles, California

adds New service facilities



The increased demand for Hercules Engines and Power Units has resulted in a nationwide expansion of Hercules sales and service facilities. The above photograph is of the new Los Angeles branch which is the latest addition to the Hercules sales and service stores.

Facilities of this and other factory branches include: a salesroom, complete parts department, offices and a fully equipped machine shop for engine repair and rebuilding. In addition to the branches in the west and southwest, Hercules distributors throughout the country stand ready to provide immediate service in the following fields: automotive, agriculture, construction, industrial, marine and petroleum.

Hercules branches and distributors provide a dependable source for genuine Hercules parts as well as experienced personnel, to provide economical repair and service of Hercules engines and power units.

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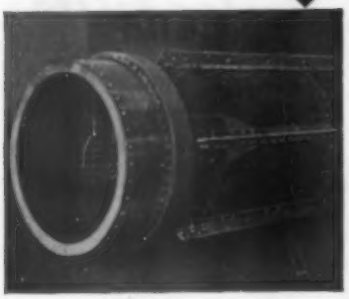

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ence amounting to wantonness or actual intent to expose another (Edward) to a known danger."

Avoid Law Suits

Recently I received several letters from producers and sellers of nonmetallic products who are worried about validity of their insurance policies, especially after reading my recent writings in these pages and the reviews of higher court decisions holding insurance companies not liable for losses. Briefly, I shall again review the established law applicable to insurance policies.

First, it is important to know that an *ordinary* insurance agent is not a legal agent of the insurance company although he is paid by the insurance company to solicit business and write insurance policies. In other words, the higher courts hold that the insurance company is not liable for promises, guarantees, or statements of protection made by a special insurance agent. Hence, irrespective of what your insurance agent tells you and no matter what protection he promises, you cannot rely on these promises; you must rely upon the protection offered by the clauses in the insurance policy.

The law is different with respect to *general* insurance agents who maintain business offices and represent insurance companies. However, since almost all insurance policies are written by ordinary or special insurance agents who solicit insurance business, readers should be certain not to rely upon promises or guarantees made by these agents. Of course, if you don't have a loss, you will never know that an insurance policy is uncollectable. Nevertheless, the higher courts consistently hold that your protection is exactly that *specified in your insurance policy* regardless of what your regular insurance agent verbally promised. I shall soon review new higher court decisions which verify my explanations of this law applicable to fire, wind, flood, theft, accident, and other insurance policies.

Partnership Liability

A few days ago I received a letter from a reader, as follows: "Are all partners personally and individually liable for the legal debts of the partnership?"

The answer is: If all members of a partnership are financially responsible the debts of the partnership are distributed equally among them. However, if only one partner is financially responsible and other members of the partnership are not

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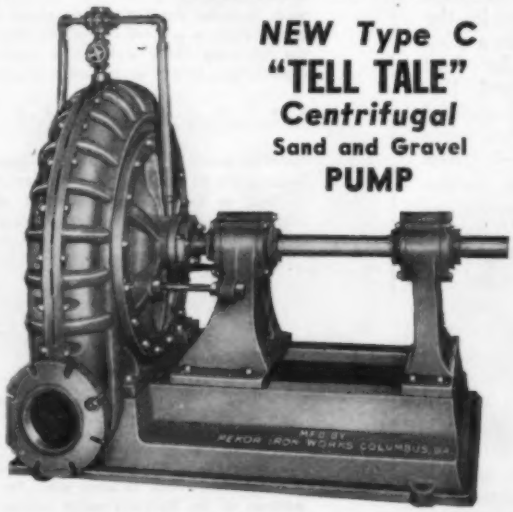

Report from Capt. Michael Toth, President, The Lake Sand and Gravel Co., Toledo, Ohio.

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financially able to pay the legal obligations of the partnership, the sole partner who is financially responsible is liable for payment of all debts of the partnership.

Another important point of the law relating to partnerships is that any partner of a partnership may contract obligations for which the partnership is liable. This is so although none of the other partners are aware that these obligations are being assumed by the one partner.

For instance, in *O'Connor v. Vander Veen,* 234 N.W. 101, it was shown that a member of a partnership purchased from a cement company certain cement which was used in furtherance of the partnership's business. At the time the purchase was made the seller was not aware that the purchaser was a member of a partnership. Later the cement company sued to recover the amount due.

It is interesting to observe that the higher court held: "If the material was ordered by one partner for the business of the partnership, and so used, the cement company (seller) had a right to look to the partnership for pay, even though unaware of the partnership relation at the time of furnishing the material."

Therefore, the law is established that a seller of material and merchandise to a partnership can sue and recover full payment from either the partnership or, if the partnership is insolvent, he may sue and recover full payment from any solvent member of the partnership.

Eminent Domain

Recently a reader wrote as follows: "What is the law when county commissioners want to condemn a gravel pit to use it for a public purpose? . . . Can they do it? If so, what money can I compel them to pay?"

The courts hold that "eminent domain" means that private property may be taken for public purposes without consent of the owner. In other words private property can be condemned and appropriated for public purposes by the United States, state, county, or municipality.

The Fifth Amendment of the United States Constitution provides that private property shall not be taken for public use without just compensation. The courts hold that "just" compensation means the full and perfect equivalent in money of the property taken. Thus the owner of appropriated property is to be put in as good position pecuniarily as he would have occupied if his property had not been taken. Actually the

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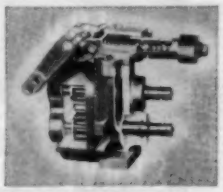
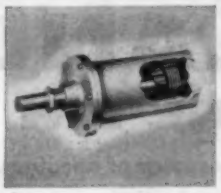


Marion pumps are built to last. Meehanite housing is used with case-hardened gears and shafts. Four anti-friction needle bearings assure smooth performance. Patented valve gives positive control for spreading . . . check eliminates back pressure. Valve action is progressive—raise, hold and lower.



Cylinders are made of seamless steel tubing bored and finished to a glass-like smoothness. There is a bolted leak-proof head. Piston has four iron Graflox-treated quick break-in rings — one ring per groove.

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owner's indemnity should be the "fair market value" of the property taken. On the other hand, according to a recent higher court "just compensation" does not mean the amount the property is worth to the present owner; it means the amount the property will bring when placed on the open market for sale. This is so although the "open market" sale price is only a small fraction of what the property is worth to the owner.

For example, in *United States v. Pennsylvania-Dixie Cement Corporation,* 178 Fed. (2d) 196, the testimony showed a cement company made a contract in writing with the land owner by which the cement company was granted the exclusive right for a period of ten years to "enter upon the land" and to remove sand in such quantities as it might desire. Soon afterward the United States condemned the land and took possession of it.

In the subsequent litigation the higher court held that the cement company could recover only the market value of the property without regard to the profits the cement company may earn by development of the property. The court said:

"The Supreme Court of the United States has made it clear that market value of property taken for public use is the standard for determination of just compensation. . . . The special quality of the sand should, of course, be considered in estimating its market value. But the final inquiry must be the fair market value of the same, assuming a purchaser willing and able to buy and a seller willing to sell."

In other words, the cement company must prove the amount for which it could have sold its lease rights in the land, which is relatively small when compared with the actual value of the sand to the cement company.

Must List Employment

Few employers realize that the state compensation laws are not applicable to incorrectly listed employees. In other words, all employees must be properly and legally listed with the State Industrial Compensation Board. Hence, the State Workmen's Compensation Act does not apply to employees whose employment is not in the usual course of trade, business, occupation, or profession of the employer. Therefore, all employers should be certain to carry state compensation insurance on employees in all different business classifications to avoid damage suits. This is so because an employee who is not thus protected by his employer may sue for damages; but if the employer carries State Workmen's Compensation Insurance the employee must accept compensation and cannot sue his employer for damages.

For illustration, in *Livingstone Company v. Hartford,* 29 Atl. (2d) 323, an employer had insurance under the State Workmen's Compensation Act which covered clerical office employees, salesmen, and drivers of motor trucks. Later the employer purchased a building and began renovating and remodeling it with his employees. One day an employee was seriously injured while unloading iron girders.

The legal question presented the court was whether the employer was protected by the State Workmen's Compensation Act or whether the employee could sue and recover damages from his employer.

The higher court held that if the employer had desired protection against injuries to employees who were working to remodel the building, he should have listed the new business and obtained a certificate from the state to this effect. In other words, the higher court held that the injured employee was not within the scope of the State Workmen's Compensation Act because he was not listed by the employer as engaged in remodeling the building. This court explained that each state lists various occupations under the State Workmen's Compensation Act, and an employee not properly listed cannot recover compensation for an injury from the Industrial Commission; but such employee may sue and recover damages from his employer.

Law of Contracts

A few days ago I received from a reader this letter: "For many years in PIT AND QUARRY I have read your legal writings. I have saved myself much money in law suits from your advice. But I am confused as to what kind of contracts are enforceable and which are not. Please give me and other readers a review of this important contract law. I don't understand when an account payment must be in writing."

First, it is important to know that the higher courts have established this law: A valid, legal, and enforceable contract is an agreement between two or more parties by which each party is expressly or impliedly

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obligated to do something lawful, within a specified time. In an expressed contract the terms of the agreement are stated in so many words; but an implied contract is a contract in which the court presumes or implies that one of the contracting parties is obligated to perform a service or obligation for the other.

The higher courts have established the rule that either an expressed or implied contract is valid and enforceable if these facts are present: (1) one of the contracting parties submits an offer which the other party unconditionally accepts; (2) both parties have certain obligations to perform; (3) the object of the contract is legal; (4) both parties are sane and of legal age; (5) the quantity and quality of the merchandise is clearly stated; (6) the contract does not violate a state or a city law; (7) neither of the parties practiced fraud or deceit.

Certain kinds of verbal contracts are valid and enforceable. On the other hand, there are many kinds of contracts that should be in writing. For example, surety contracts, contracts relating to the sale of real estate or lease of real property, and to the sale of certain kinds and value of chattels must be in writing, otherwise the contract is void.

A contract by which a person guarantees the account of another must be in writing. However, ordinary verbal contracts for purchase of nonmetallic material is valid. For example, if a purchaser says: "Let this man have $1,000 worth of material and I will pay for it," this is a valid contract because he personally assumes the debt. On the other hand, if he says: "Let this man have $1,000 worth of material; and if he does not pay for it, I will," *this is a surety contract, and the law requires that such contracts must be in writing.*

In other words, a verbal contract is valid and enforceable by which a person guarantees or promises that he, himself, will pay for merchandise purchased by him or another person. However, if this person orally states that he will pay the bill if the purchaser fails to pay, this is a surety contract and absolutely void unless in writing and signed by the person who makes the guarantee.

Liability For Blasting

Considerable discussion has arisen from time to time over the legal question: When is a property owner liable in damages to persons injured by blasting operations of his tenant?

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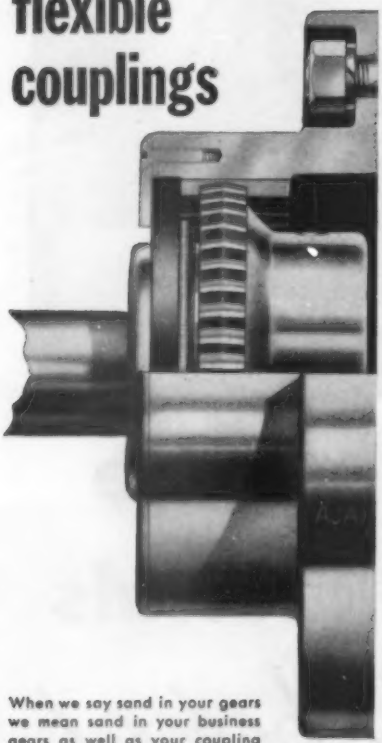

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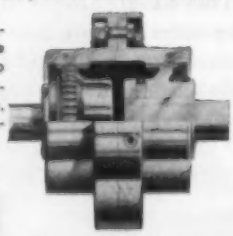

AJAX

FLEXIBLE COUPLING COMPANY INC. WESTFIELD, N.Y.

Recently I received a letter from a land owner who had leased his land to a quarry company. He wants to know whether he may be liable for blasting operations of this lessee, or quarry company.

It is important to know that modern courts consistently hold that if a dangerous condition "or legal nuisance" is created on land by a person other than the owner, and the owner was not instrumental in causing the nuisance, such a land owner is not liable for damages by the nuisance. In other words, the real basis of liability which arises from the creation or maintenance of a nuisance does not depend upon the ownership or possession of the land on which it is located.

On the other hand, it may be further explained that a property owner may be liable for the continuance of a nuisance when he has knowledge of its existence although it was created by an unauthorized person. Further, the owner of land may be liable for a dangerous condition or nuisance on his land originated by his tenant if, with knowledge, he permitted a continuation of the same. However, where a property owner is not aware that a tenant or leasee is maintaining a dangerous condition, modern higher courts hold that he is not liable for resultant injuries to persons or property.

See the leading case of *Tennessee Company v. Hartline*, 11 So. (2d) 833. Here a corporation leased land from its private owner for the purpose of obtaining rock by blasting operations. One White was seriously injured when a rock struck him during blasting operations. White sued the owner of the land for $20,000 damages.

During the trial the land owner introduced testimony that he had no information as to how the blasting was being done by the corporation, or lessee. In view of this testimony the higher court refused to hold the owner of the land liable in damages to the pedestrian and said:

"The landlord was not charged with the knowledge of a nuisance caused by improper blasting by tenants, or by others upon its leased premises without his knowledge or consent."

For comparison see *Birmingham Ore Company v. Grover*, 159 Ala. 279. In this case the higher court held the leasor, or land owner, liable in damages for injuries caused by blasting operations of the leasee because the testimony proved that the land owner knew that the blasting operations were being dangerously performed by the leasee. The court said:

"If a party (land owner) knows or has reason to believe that any one is in dangerous proximity to the place where the blasting is being done, it is the duty of the person either to prevent the throwing off of material, or to give warning when the blasting is about to be made in order that those in perilous places may seek a place of safety."

Also, it is quite well settled law that if a property owner's employees perform blasting operations, the law requires the property owner and his employees to use at least ordinary care to avoid injuries to persons and private property.

Another legal question in the minds of numerous buyers, sellers, and producers of nonmetallic products from my conversations with them, relates to "as is" contracts. The important question is: Does an "as is" clause in a sale contract relieve the seller from any and all implied and expressed guarantees? The answer is: Yes, generally. This is so because, according to a late higher court, "as is" in a contract is equivalent to a full and complete

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statement that no guarantee is given by the seller. In fact an "as is" clause in a contract of sale cancels and invalidates either an expressed or an implied guarantee.

For illustration, in *Johnson v. Waisman Bros.*, 36 Atl. (2d) 634, the testimony disclosed facts as follows: A junk or scrap metal dealer purchased an old steam shovel for $25. The junk dealer soon afterward sold it to an excavation contractor for $225. The written contract between the junk dealer and the purchaser contained a clause which provided that the shovel was being sold "as is". The purchaser and excavation contractor entered into a contract with a company to do certain excavation work for sand and gravel. Later the purchaser sued the junk dealer for damages based upon the profits he would have earned on the job had the junk dealer completed the contract. The higher court refused to hold the junk dealer liable, and said:

"The plaintiff (purchaser) was not entitled to assume that the shovel would do the work in question. The seller sold it 'as is' and this term, when contained in a memorandum of purchase and sale, means that the seller and the purchaser buys the specific chattel in its then existing physical and mechanical condition and without warranty as to quality or fitness for a particular purpose."

Independent Contractor

During the last few months I received several inquiries regarding the law pertaining to individual contractors. I located a case exactly in point. This higher court held that an employer who employs a person to work as an "independent contractor" is not liable in damages for injuries caused by such employee, nor for injuries sustained by the employee, nor for payment of Social Security, Unemployment Compensation, and like taxes. This court also held that an independent contractor is one (1) who performs work requiring skill; (2) who produces results according to his own means and methods; (3) who furnishes a part or all of the material or equipment for doing the work; (4) who is paid either a gross sum of money or by piece work; (5) and who is under no obligation to work exclusively for one particular employer.

In *Corder v. Morgan Company*, 166 S. W. (2d) 455, it was shown

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that an employee named Corder was employed by a company, and was paid by the hour. The men on the job were under his control, and he paid them and kept records and made reports to his employer. Corder used his own automobile to make trips for his employer, who paid all expenses incident to the use of the car.

One day Corder was making a trip in his automobile to the place where he was supervising a job, and he collided with another automobile. In subsequent litigation Corder's employer contended that he was not liable because Corder is an independent contractor.

The higher court held the employer liable stating that Corder is not an independent contractor because his employer paid him hourly wages.

This court explained that an employee is an independent contractor only when he works independent of control by his employer; on a job payment basis; and when the employer does not furnish tools, equipment, or motor trucks to enable the employee to do his work, or complete his contract.

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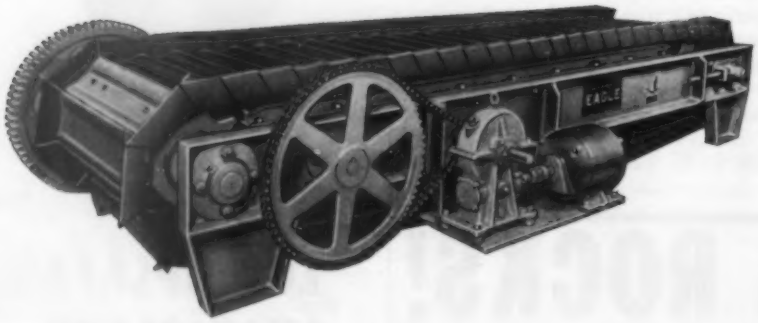

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1952 Sand-Gravel Production Higher in Volume and Value

The production of sand and gravel in 1952, as reported to the U.S. Bureau of Mines, totaled 436,517,000 short tons, valued at $353,699,000. This was 9 percent higher in quantity and 6 percent greater in value than the corresponding 1951 figures. Approximately 69 percent of the total production came from commercial operations and the balance from plants operated by, or for, federal, state, county, and municipal governments.

California produced more sand and gravel than any other state; Michigan came second. These were followed by Wisconsin, Ohio, New York, Minnesota, Illinois, and Texas in the order named, these eight states accounting for more than 50 percent of total United States production.

Sand and gravel sales reported by commercial producers only was 301,728,494 short tons, almost 6 percent greater than 1951 commercial sales. Commercial sand and gravel used for paving increased 4 percent over 1951 to 117,833,219 short tons, while that used for building increased 3 percent in 1952 to 139,924,252 short tons. Sand used for industrial purposes declined in all categories except filter sand. The total decline was almost 9 percent to 17,313,505 short tons.

Washed, screened, and otherwise prepared sand and gravel comprised 90 percent (272,225,449 short tons) of total commercial production. The average value for this prepared product was $1.02 per ton, compared with 53 cents for unprepared commercial bank-run material. In contrast, only 35 percent of government-and-contractor production was prepared, and the average value was reported as 84 cents per ton and 22 cents per ton for bank-run material.

Trucks moved 74 percent of all sand and gravel in 1952, compared with 70 percent in the previous year; and rail haulage dropped from 20 percent to 19 percent in 1952. Waterway haulage was constant at 6 percent, leaving 1 percent unspecified.

Production of sand and gravel for the use of government agencies accounted for 31 percent of total production, compared with 29 percent in 1951. The total tonnage rose to 134,788,739 short tons, both sand and gravel showing increases for paving use and decreases for building purposes. States reported 51 percent of the total, counties 29, federal agencies 18, and municipalities 1. Of the total tonnage, 35 percent was produced by contractors and 65 percent by government construction and maintenance crews.

More Information, Please

Use the prepaid postcard to get this literature or additional details about new equipment and products reported elsewhere in this issue.

DIESEL USERS will welcome this *Bacharach* sheet describing testing equipment and service tools that help keep engines at top performance. (1)

CEMENT MILL electrical modernization can be done without shutdowns, this *General Electric* 16-page treatise shows. (2)

ROTARY kilns, coolers and dryers made by Traylor Engineering are described in this new 40-page illustrated brochure. (3)

LABORATORY PLANNING. This is a revised edition of the *Scientific Apparatus Makers Assn.* booklet "Better Laboratory Planning." (4)

CAM FOLLOWER ROLLERS for high speeds and heavy loads are described in this *Smith Bearing Co.* bulletin. The unique bearings cut maintenance and replacement costs. (5)

WIRE ROPE that resists corrosion is described in this *Macwhyte* folder on preformed stainless steel and monel rope. (6)

REFRACTORIES for intermediate and high duty service are shown in this *Harbison-Walker* Coleman and Coleman XX bulletin. (7)

WELDING SAFETY is discussed in this valuable 32-page *Air Reduction* booklet filled with helpful sketches and concise text. (8)

COMPRESSOR. The *Joy* series 100, class WN-114 heavy-duty industrial compressor line is described in this 36-page bulletin. (9)

QUARRY EQUIPMENT is shown in this 32-page *Universal Road Machinery* brochure on Reliance crushers, feeders, screens, washers, bins, elevators, etc. (10)

DUCTILE CAST IRON, a new engineering material, described in this *International Nickel* bulletin, combines advantages of cast iron with engineering properties of cast steel. (11)

TWO-WAY TIRE. The *General* HCT tire described in this folder is built to give both extra mileage on-the-highway and extra traction off-the-highway. (12)

THICKENERS of the spiral-rake type are discussed in detail in this 12-page *Denver Equipment* brochure. (13)

QUARRY AND GRAVEL PLANT equipment made by *Acme Road Machinery Co.*—crushing, screening, conveying, etc.—is shown in this 4-page folder. (14)

FUNDAMENTALS of centrifugal pumping are presented in this interesting and informative 12-page *Ingersoll-Rand* booklet. (15)

MINERAL DRESSING NOTES, issue 20, from *American Cyanamid,* covers the reagents used in ore beneficiation and discusses flotation methods. (16)

A DATA BOOK on screw conveyors, replete with much handy information, has been published by *Continental Gin Co.* (17)

PUMPS for sand, slurry and dredge use are shown in this 16-page brochure about the *Allen-Sherman-Hoff* Hydroseal line. (18)

HARDFACING data—practical job details—fill this loose-leaf presentation from *Industrial Overlay Metals,* maker of Bergstrom free-flowing electrodes. (19)

"HALTS-RUST" paints produced by *Steelcote Mfg. Co.* stop and prevent rust and resist chemical corrosion. (20)

BELTING for elevators and conveyors is described and detailed in this *Hamilton Rubber* catalog. (21)

SCREENS and wire cloth are pictured in in this *Ludlow-Saylor* bulletin. (22)

INDUSTRIAL PRODUCTS for many applications—insulation, refractories, packings, gaskets, friction materials, etc.—are shown in this 40-page *Johns-Manville* catalog. (23)

TRACTORS and allied equipment made by *Allis-Chalmers* are shown in this 36-page catalog. Crawler and wheel models are included, with scrapers, wagons, etc. (24)

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More Information, Please

Use the prepaid postcard to get this literature or additional details about new equipment and products reported elsewhere in this issue.

DISINTEGRATORS of the cage type, built by *Steadman's Foundry*, described in this bulletin, are built in 10 sizes for breakdown, medium fine and fine grinding. (25)

DRILLING GUIDE to better footage, lower costs from *Brunner & Lay* tells in picture and text how to recondition carbide Rok-Bits. (26)

OPEN GEAR LUBRICATION is discussed in this *Brooks Oil Co.* reprint of a talk by one of its executives at the Society of Lubrication Engineers annual meeting. (27)

BAG SEWING. The *Bemis* sewing machine base and conveyor is discussed in this bulletin. (28)

SPROCKETS of cast steel for conveyor and elevator applications are shown in this *Farrell-Cheek* bulletin. (29)

THE INSIDE STORY of "today's most advanced shovel-crane control system" is told in this 12-page *Link-Belt Speeder* brochure. (30)

OXYGEN-INDEX of combustion processes is discussed in this *Beckman* bulletin. Proper air control is needed for maximum combustion values. (31)

CONTROL INSTRUMENTS made by *Wheelco* are shown in this bulletin. (32)

IMPELLER BREAKER made in several sizes in Germany by *Hazemag* with output from 2 to 250 tph. (33)

BAG BACKGROUND. The fascinating tale of paper making for multiwall bags is recounted by *Hudson Pulp & Paper*. (34)

CHAIN made of manganese steel gives **ABRASION-RESISTANT** electrodes made veyors and drives, etc. says this *Taylor-Wharton* Tisco bulletin. (35)

ABRASION-RESISTANT electrodes made of molybdenum, boron and iron (*Coast Metals* No. 170), described in this bulletin, replace more costly carbide materials in many uses. (36)

MUD HOG CRUSHER for reducing all types of wet, sticky materials, is described in this 12 page *Jeffrey* brochure. (37)

LEAKPROOF HOSE coupling for air, water, oil, steam lines, etc. connects and disconnects in a moment, this *Titeflex* booklet explains. (38)

ELECTRIC MOTORS, totally-enclosed, fan-cooled, ½ to 25 hp, with rugged construction and extra bearing protection are described in this *Allis-Chalmers* bulletin. (39)

MORE POWER at less cost is promised with the six industrial diesel engines shown in this *Caterpillar* bulletin. (40)

A HANDY BULLETIN on temperature control systems, issued by *Barber-Colman*, is valuable to have around. (41)

MULTIPLE V-BELTS. A valuable handbook of information, design data, standard ratings and related information on V-belting and its use has been issued by *Goodyear*. (42)

MODERNIZE with electricity urges *Westinghouse* in this 16-page brochure titled "Compete or Collapse". (43)

WIRE ROPE recommendations are interestingly incorporated in this unusual new catalog issued by *Roebling*. (44)

UNUSUAL BAG closure, the Kraft-Lok, devised by *Kraft Bag Corp.*, is shown in this literature for multiwall bag users. (45)

MESABI SCREENS, built for severe vibrating duty, are discussed in this new 16-page *Pioneer Engineering* bulletin. (46)

FIRE CLAY REFRACTORIES are discussed in a new handbook from *Walsh Refractories Corp.* The 126 page work is filled with handy information. (47)

ELECTRIC MOTOR CONTROLS made by *Allen-Bradley Co.* for every application are featured in this comprehensive catalog. (48)

TRACTOR LOADER. *Baker-Lull* shows the new Shoveloader, a rubber-tired unit that has several handy accessories in addition to its 12 cu. ft. bucket. (49)

ENGINES NEED AIR! Every engine user will welcome this informative, easy-to-read bulletin in which *Cummins Engine Co.* discusses the importance of air in combustion engine operation. (50)

JULY 1954

Please send more information on circled items described in this issue:

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38
39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57
58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76
77	78	79	80	81	82													

In addition I would like information on:

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Company_____

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Traffic News

CENTRAL TERRITORY RAILROADS
Freight Traffic Committee

Docket 90565 (2) — Proposed to establish rate of 153 cents per net ton on sand, all kinds, and gravel in open-top cars, minimum weight 90 percent of marked capacity of car, except that when car is loaded to full visible capacity, actual weight will apply from Gnadenhutten, Ohio, to Mingo Junction, Ohio.

Docket 90577 (2)—It is proposed to establish rate of 226 cents per net ton on limestone, agricultural unburned (not ground or pulverized) in bulk, carloads, in open-top cars, minimum weight 90 percent of marked capacity of car, except that when car is loaded to full cubical or visible capacity, actual weight will apply from Narlo and Maple Grove, Ohio, to Senecaville, Ohio.

Docket 90615 (1)—It is proposed to establish a rate of 250 cents per net ton on gravel, in open-top cars, carloads, minimum weight 90 percent of marked capacity of car, except that when loaded to full cubical or visible capacity, actual weight will apply from Shoals, Ind., to Joliet, Ill.

Docket 90628 (1)—It is proposed to establish a rate of 185 cents per net ton on stone, rip rap, in open-top cars, carloads, minimum weight 90 percent of marked capacity of car except that when car is loaded to full cubical or visible capacity, actual weight will apply from Georgia, Ind., to Cincinnati, Ohio.

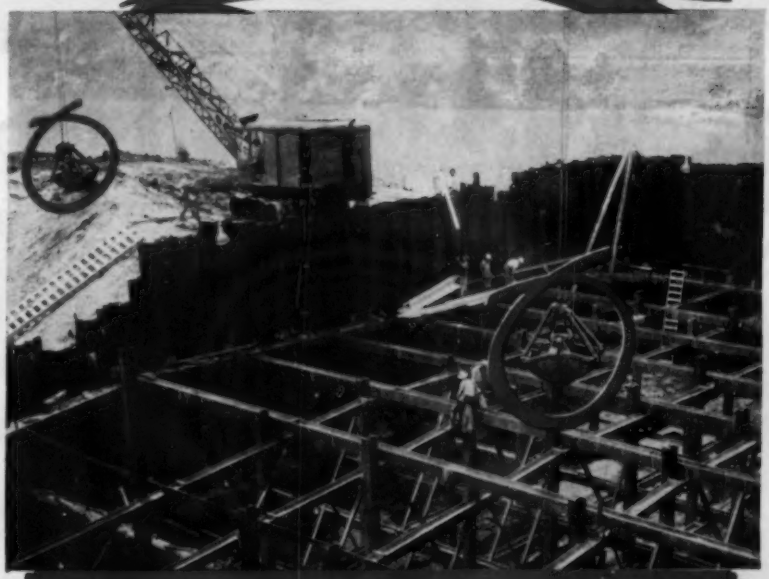
Docket 90631 (1) — Proposed to establish the following rates on limestone, ground or pulverized, unburned, carloads, minimum weight 40 tons, from Bedford, and Bloomington, Ind., Stone District:

	Open Cars	Closed Cars
	Per Net Ton	
Akron, Barberton, Ohio	284 cents	334 cents
Canton, Ohio	297 cents	346 cents
Mansfield, Ohio	260 cents	310 cents
Massillon, Ohio	284 cents	334 cents
Youngstown, Ohio	321 cents	370 cents

EASTERN RAILROADS
General Freight Traffic Committee

Bulletin C 1610-61—It is proposed to establish a rate of $2.92 per net ton on gravel, in open-top cars, minimum weight 90 percent of marked capacity of car, but not less than 40 tons, from Madison, Ohio, to Sproul, Pa. This rate is subject to ExParte 175-B increase.

PLACEMENT CONTROL



AN OWEN FEATURE

The placing of a bucket in a narrow trench or caisson; or between closely spaced cribbing requires skill.

Whether it "lands" properly to assure efficient digging is largely a matter of correct bucket design.

Many an operator prefers Owen Buckets because they respond readily to his efforts — go where he wants them to go — and land in unseen places in an upright position ready to take a tremendous bite.

It's largely a matter of design — proportioning and balance, all of which are built into every Owen Bucket as a result of decades of "know-how" based on specialized experience.

AN ARMFUL AT EVERY GRAB

THE OWEN BUCKET CO.

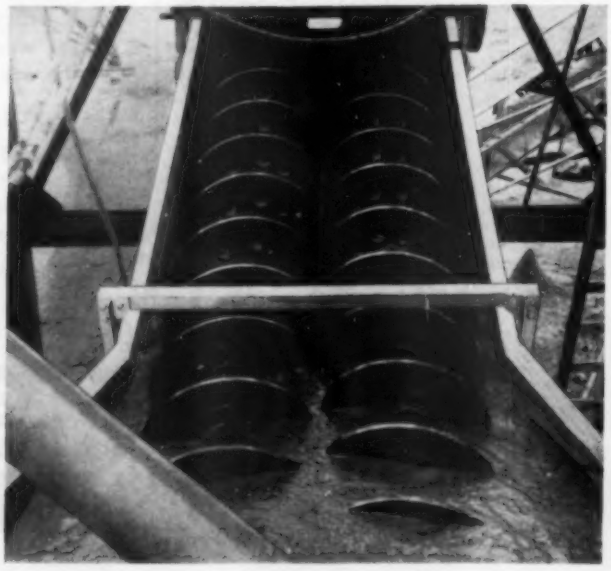
6050 Breakwater Ave., Cleveland 2, Ohio

BRANCHES: NEW YORK, PHILADELPHIA, CHICAGO, BERKELEY, CALIFORNIA, FT. LAUDERDALE, FLORIDA

PUT THE SCREWS ON

This Seneca, Ill., aggregate plant of River Industries, Inc., averages 900-tons plus, daily, of really clean, graded material. The dual Eagle 32' Water Scalping Tank removes excess water and pre-classifies material. Note clear water flowing over weir. Adjustable valves regulate precipitation. There is an Eagle Water Scalping Tank for every requirement.

One of the three Eagle Double Screw Fine Material Units at River Industries—each receives pre-classified material from a particular cell of the multi-cell collecting-blending flume and the screw speed and overflow weir of each washer is set to produce a definite gradation of materials. This is a pumping operation, but Eagle Equipment performs equally well at dry pit operations.



WASHING AND CLASSIFYING COSTS!

But be sure they are Eagle Screws . . . because at plant after plant EAGLE Long Weir Fine Material Screw Washer-Classifier-Dehydrators are giving aggregate producers the clean gradations of material they want, at minimum cost per ton. If the required meshes of material are in your deposit an EAGLE Water Scalping Tank combined with Eagle Screw units will give you various mesh percentages blended to the queen's taste. It's being done every day—all over the country. If certain meshes are too plentiful they can be readily bled off. Meeting stiff specifications is no problem.

Aggregate Washing and Classifying Equipment is our business . . . and has been for nearly half a century. There's a size and type of Eagle Washer for every requirement of aggregate producers . . . you can bet that it will last longer, give you less trouble, cost less to maintain and make you more money than ANY equipment designed to improve on deposits as Mother Nature made them. EAGLE Washers have often been copied, but EAGLE'S experience and our organization foresquare behind every EAGLE Washer sold cannot be copied. Parts available for any EAGLE Washer ever built . . . factory-trained distributors everywhere to serve you.

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"Equipment that your friends will recommend"

NEW, Information-Packed 42-page Catalog 54 tells the story. There's nothing like it! Send for your copy; write EAGLE IRON WORKS, 133 Holcomb, Des Moines, Iowa.

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EAGLE IRON WORKS

Leaders in Aggregate Washing and Classifying Equipment for a Half Century

ILLINOIS FREIGHT ASSOCIATION

Docket IRC 511-1378—It is proposed to establish a rate of 85 cents per net ton on stone, crushed, from Pontiac and McDowell, Ill., to Gibson City, Ill., in open-top cars, carloads. Rate is subject to X-175-B increase.

Docket IRC 511-1379—It is proposed to establish rates shown below on limestone, crushed or ground, carloads, from Valmeyer, Ill., minimum weight of cars 90 percent of marked capacity of car, except that when loaded to full visible capacity, actual weight will apply, but not less than 30 tons. To following:

	Open Cars Per Net Ton	Closed Cars Per Net Ton
Galva, Wyanet, and Wyoming, Ill.	211	228
Joliet, Ill.	237	253

Rates subject to X-175-B increase.

Docket IRC 511-1373 — Proposed to establish on crushed stone, in open-top cars, carload minimum weight 90 percent of marked capacity of car, except that when car is loaded to capacity, actual weight, but not less than 20 tons, will apply, from Polo, Ill., to the following Illinois points:

	Per 100 lb.
Chadwick	89 cents
Savanna, Rochelle, Davis Jct.	101 cents
Proving Ground, Fulton, Clinton, Rockford	113 cents
Galena, E. Dubuque, Erie, Aurora	125 cents
Walnut, Sterling, Rock Falls, Downers Grove	138 cents

Above rates subject to X-175-B increase.

Docket IRC 511-1377 — Proposed to establish intrastate rates on agricultural limestone, carloads, minimum weight marked capacity of car (or actual weight) when loaded in open cars to full visible capacity from McCook, Ill., to C. & I. M. stations in Illinois:

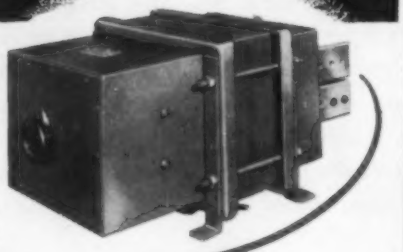
	Open Cars Cents per Net Ton	Closed Cars Cents per Net Ton
Kelsey, Long Branch, Tice, Athens, Barr, Andrew, Cimic, Taylorville, and Auburn	150	160

Subject to X-175-B increase.

LET THE RECORDS SPEAK!

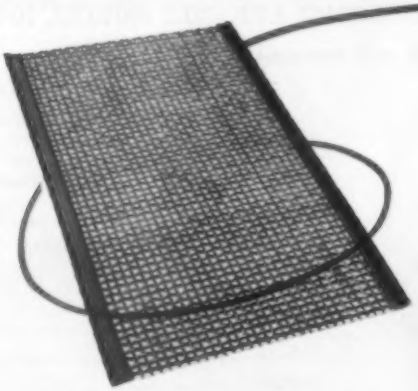
HANCO SCREEN HEATERS

ELIMINATE *Costly* SCREEN BLINDNESS



FASTER, MORE ACCURATE SIZING

HANCO electric heaters are engineered to meet top capacity requirements for heating **all** metallic screen cloth. Mechanical abuse such as "beating" or brushing can be **eliminated completely** when you install a HANCO electric heater. Treat your screens the modern way – get HANCO.



Available in five different assemblies. HANCO engineers have designed and constructed electrical screen heaters to fit YOUR make of screen. Note: Reduction in openings can be effected to meet ever changing specifications.

LOOK AT THESE FEATURES

Faster screening—faster processing means fewer "returns".

Elimination of mechanical abuse to keep screens open.

Longer screen life — no manual cleaning increases screen life up to 800%.

Fewer shut downs for replacement of worn screens.

HANCO quick change assemblies assure easy cloth changes.

Low maintenance cost. HANCO heaters are designed for heavy-duty service.

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PIONEERS IN ELECTRIC SCREEN HEATING — FIRST IN THE FIELD OF LOW VOLTAGE AND HIGH AMPERAGE SCREEN HEATING

NORTH PACIFIC COAST FREIGHT BUREAU

Docket X NC-4090—Proposed to establish a rate of 21 cents per hundredweight in open-top cars and 23 cents per hundredweight in closed cars, on limestone—crude, crushed or ground, carload, Durkee, Oreg., to Seattle, Wash., minimum weight, car 50 tons.

Docket Nc 3607 Supplement 2—Request a through rate on limestone in carloads from Durkee and Nelson, Oreg., to Lewiston, Idaho.

Docket NC 4124 (S) — Request rate of 20 cents per hundredweight on gypsum, crude, crushed, ground, or powdered in open or closed cars, carload, from Huntington, Oreg., to Spokane, Wash., and Austin, Lewiston, Orofino, and Moscow, Idaho. Minimum weight, 50 tons.

Docket NC 4138 — Proposed to establish on gypsum, crude, crushed, powdered, or ground, in carloads, from Ellisford, Wash., to the following points: Orofino, Idaho, 25 cents; Craigmont, Idaho, 35 cents; Greer, Idaho, 31 cents; Grangeville, Idaho, 38 cents; Stites, Idaho, 33 cents; Culdesac, Idaho, 31 cents. Minimum weight of car, 50 tons. Rate is not subject to X-175 increase.

SOUTHWESTERN FREIGHT BUREAU

Docket 66773 (X) (C) — Proposed to establish specific commodity rate of 84 cents on crushed stone from Carthage, Mo., to Neosho, Mo., carloads, in open-top equipment. Rate not subject to X-162-6-8 increase.

Docket 68774 (S) — Proposed to establish commodity one-factor rate of 554 cents per net ton on limestone,

ground, from Rockwood, Ala., to Kansas City, Mo. Rate not subject to X-162-6-8 increase.

TEXAS-LOUISIANA FREIGHT BUREAU

Docket 13787-TX — Proposed to establish rate of $1.48 per net ton on limestone, crushed, from Crawford, and $1.68 per net ton from Cleburne, Tex., to Evadale, Tex., in open-top cars, minimum weight will be the marked capacity of the car, except that actual weight will govern when cars are loaded to full visible capacity. Rates subject to X-175 increase.

TRUNK LINE TERRITORY RAILROADS

Freight Traffic Committee

Bulletin N 4611 M-12 — It is desired to publish a rate of 40 cents per net ton on crushed stone, in bulk, in open-top cars not protected by tarpaulin or other protective coverings, from Aggregates, W. Va., to Elkins, W. Va. This rate is subject to ExParte 175-B increase, minimum weight 90 percent of marked capacity of car. This rate is desired to meet motor competition.

Bulletin N 4611-13 (Shipper)—Proposed to issue rate of $2.07 per net ton to meet motor truck competition from Pleasant Gap, Pa., to Timblin, Pa., on stone, crushed and screenings, in straight or mixed carloads, in bulk, open-top cars. This rate will not include ground limestone, agricultural limestone, unburned, fluxing, stone or firestone or stone coated with oil, tar, or asphaltum. Carload minimum weight 90 percent of marked capacity of car. Rate subject to X-175-B increase.

Bulletin N 4611-11—Proposed to establish rate of $1.85 per net ton to meet motor truck competition on stone, crushed, uncoated, in open-top cars without protective covering, carload minimum weight 90 percent of marked capacity of car from LeRoy, N. Y., to Belmont, Scio, Belvidere, Andover, and Wellsville, N. Y. Rate not subject to ExParte 175-B increase.

WEEKLY DOCKET AND STATUS REPORT OF PRIOR SOUTHERN FREIGHT ASSN. PROPOSALS

Docket A 12304 (ERR S C 1513-23—It is proposed to establish a rate of 131 cents from Akron and Barberton, Ohio, to Bryant, Tex., on calcium of lime, silicate of lime in carloads.

Docket A 18561 (C)—It is proposed to establish a rate of 626 cents per net ton on limestone, broken, crushed, ground or pulverized, carloads, 30 tons. Rockwood, Ala., to West Fredericksburg, Va.

Docket A 18679 (c)—It has been proposed to establish a rate of 517 cents per net ton on stone, crushed, in bags in closed cars, carload, 30 tons. From Lithonia, Ga., to Elkton, Va.

Docket A 18696 (c)—Proposed to establish rate of 55 cents on stone, rock-faced or split-faced, carload, 35 tons, from Tate and Nelson, Ga., to Toronto, Ont.

WESTERN TRUNK LINE COMMITTEE

Docket E-41-2019 (S)—Proposed to establish rate of 676 cents per net ton from Florence, Colo., to Fargo, N. D., and 718 cents net ton from Florence, Colo., to Grand Forks, N. D., on rock, perlite, broken, crushed, or ground, dried or not dried, not expanded, carload. Rates subject to X-175-B increase.

Docket X-E-41-2022 (S) — Proposed to establish a rate of $1.11 per net ton on limestone, agricultural (having value for purpose of soil treatment), minimum weight 90 percent of marked capacity of car from Huntington, Mo., to Kirksville, Mo. This is shown in item 55 of Wabash tariff X 8855, ICC 7625. Rate is subject to X-175-B increase.

Now available in quantity production

Here is a high molybdenum silicon alloy steel drilling bit that will cut its way through the hardest formations faster, at less cost per foot, and with fewer dressings, than the conventional carbon steel bit used in ordinary drilling practice. The SPANG MOLLOY BIT is a *special* alloy bit, completely heat treated, with higher strength in the blade section and greater pin strength. Because of its deep penetrating hardness, it resists abrasion and battering under the severest drilling conditions. Its use is recommended where ordinary bits are ineffective.

Unlike most high alloy bits, SPANG MOLLOY BITS can be field dressed and tempered by following practices similar to those for carbon steel bits.

When you encounter formations that slow you down and skyrocket costs, ask your Dealer for SPANG MOLLOY BITS—"The Red Bit with the Yellow Collar."

For complete information on MOLLOY BITS and FREE CATALOG of other SPANG CABLE TOOLS, consult your nearest SPANG DEALER or write direct to:

SPANG & COMPANY

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For over 60 years Manufacturers of Spang Weldless Jars and a Complete Line of Cable System Drilling and Fishing Tools for Oil and Gas Wells, Water Wells, Prospect Drilling and Shot Blast Holes.

at IDEAL with a

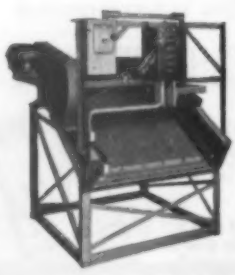
SAUERMAN SCRAPER

Using oyster shell from Mobile Bay and clay from the company's own deposit at West Baton Rouge, La., Ideal Cement's portland cement mill produces 6,000 barrels of cement per day. The clay, dumped by trucks into a soaking pit, is moved to the wash mill by a 2-cu. yd. Sauerman Scraper. Because of the nature of the material, the Crescent scraper bucket must be able to move freely from side to side of the pit in order to do a good job. This is accomplished by attaching the scraper cables to a monorail-trolley system at the front and rear of the soaking pit. The scraper handles 40 tons of clay per hour with a smoothness and economy of labor that further increases the overall efficiency of this mill.

Savings in labor costs, economy of operation, and rapid hauling are just three of the advantages provided by Sauerman Drag Scrapers. One machine —one man—efficiently controls the entire operation. Sauerman Scrapers have proved themselves in hundreds of applications all over the world. Better performance, less wear and maintenance mean more profits for you. Buckets range from ⅓ to 15 cubic yards. Gasoline, diesel, or electric powered.

Write for illustrated Catalog E, "Bulk Storage by Power Scraper" and "32 Tested Methods for Handling Bulk Materials." Sauerman Bros., Inc., 534 S. Clinton St., Chicago 7

SAUERMAN BROS., INC.



Leahy Differential Vibration *PLUS* FlexElex Electric Heating

Makes a Big Difference in difficult screening of such materials as damp lime, ag-lime and silica sand. No other heated screen eliminates blinding caused by wedging intermediate sized fines.

It will pay you to get full information about this profitable combination.
Ask for Bulletin 15-J.

THE DEISTER CONCENTRATOR COMPANY
911 Glasgow Avenue Fort Wayne 3, Indiana

Docket X-E-41-2031 (S) — Proposed to establish rate on stone, crushed, described in item 330-B Supplement 9, Western Trunk Line tariff 237-1 from Huntington, Mo., to West Quincy, Mo., 66 cents per net ton. This rate is subject to Ex-Parte 175-B increase and will expire December 29, 1954.

Docket X-E-41-2046 — Proposed to establish rate of 45 cents per net ton on crushed stone, carloads, also sand, carloads, from Cedar Falls, Iowa, to Parkersburg, Iowa. Rate not subject to X-175-B increase.

Docket X-E-41-2049—It has been proposed to establish rate of $1.16 per net ton on sand and gravel, in open-top equipment, from Sampsel Gravel Pit, Mo., to Burlington Junction, Mo. This rate is subject to X-175-B increase.

U.S. Mines Bureau Yearbook Preprints Now Available

Preprints of the first consolidated reviews of developments in mining and metallurgical technology to be published in the Bureau of Mines Minerals Yearbook are now available from the United States Government Printing Office.

Beginning with the 1952 edition the Minerals Yearbook will be published in three volumes instead of one. Volume I will cover metals and nonmetallic minerals, volume II, fuels, and volume III, geographic areas. The complete volumes will be published later.

Copies of *Review of Mining Technology—1952* or *Review of Metallurgical Technology* can be obtained *only* from the Superintendent of Documents, United States Government Printing Office, Washington 25, D. C., at 10 cents a copy. In ordering, each should be identified as a preprint from the Bureau of Mines Mineral Yearbook—1952. These publications are *not* for sale by the Bureau of Mines.

Slate Waste Utilization Seen in Bloating Process

The research department of Alfred University, Alfred, N. Y., is at work on experiments which, if successful, will open new markets for the operators of slate quarries.

Under the direction of Donald Dickens, the laboratory is seeking a practical means for expanding or "bloating" slate. Such bulky filler could be used in place of cinders in mixing lightweight concrete and also for insulation, fill, etc. Development of such a process would utilize much material which is now a costly waste in the slate quarrying industry.

trade notes

William Blackie, a vice-president since 1944, has been elected executive vice-president of Caterpillar Tractor Co., Peoria, Ill.

Mr. Blackie joined Caterpillar in 1939 and has served as chairman of the board of Caterpillar Tractor Co. Ltd., of Coalville, England, and as a member of the board of Trackson Co. of Milwaukee from the time those subsidiaries became a part of Caterpillar.

William Blackie

R. H. Tomlinson

R. H. Tomlinson has been appointed Eastern Division sales manager of The Galion Allsteel Body Co., Galion, Ohio.

Mr. Tomlinson will direct sales and service of Galion Allsteel dump bodies, hydraulic hoists and LOADevator hydraulic tailgates in all states east of the Mississippi. His headquarters will be at the Galion Allsteel plant in Galion, Ohio.

H. K. Porter Co., Inc., Pittsburgh, Pa., has announced the acquisition of Pioneer Rubber Mills Inc., of Pittsburg, Calif., manufacturer of industrial rubber products on the Pacific Coast. The new acquisition will be part of the Quaker Rubber Corp., an H. K. Porter Co. Division.

Also announced is the appointment of Walter Murken as production manager of Quaker Rubber Corp. Mr. Murken will be responsible for the planning and scheduling of all production facilities at the Philadelphia plant.

The Northeastern district office for the Bag Division of the Virginia-Carolina Chemical Corp., has moved to new offices at 99 Park Avenue, New York, N. Y.

Pennsylvania Crusher Co. has moved its offices from Philadelphia, where they have been located for nearly 50 years, to the firm's own building in nearby West Chester, Pa. The test crush laboratory is also being moved from Norristown, Pa., to the new quarters, thus putting the engineering department and the laboratory, as well as the general office staff, all in the same building.

Jack Graham of Toronto, Ont., Canada, will represent the Flexible Steel Lacing Co., Chicago, Ill., in the provinces of Ontario and Quebec. The company manufactures belt fasteners for joining conveyor, transmission, and V-belts.

As a factory and field-trained representative, Mr. Graham has full knowledge of problems concerning fastening of belts.

IT COSTS NO MORE TO USE THE BEST

REPLACE WITH "Indian Brand"

MANGANESE STEEL
Shovel Dippers
Dipper Teeth
Shovel Treads

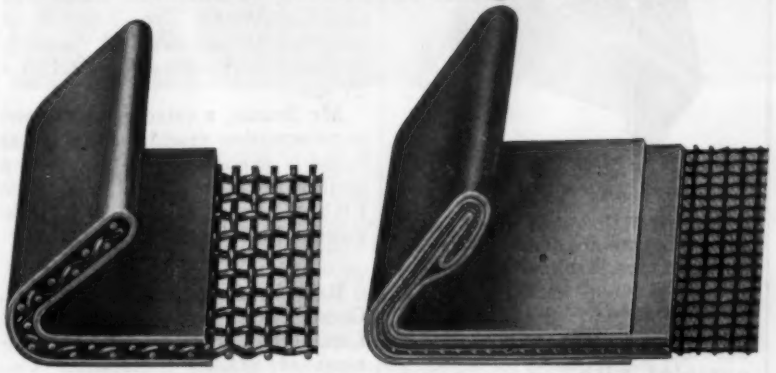
Crusher Jaw Plates
Mantles—Concaves
Bowl Liners
Roll Shells

Pulverizer Hammers
Grate Bars—Breaker Plates

Ball Mill Liners
Screen Plates

The Frog, Switch & Mfg. Co. CARLISLE, PA.
ESTABLISHED 1881

Tyler Screen Sections for All Makes of Screening Machines!



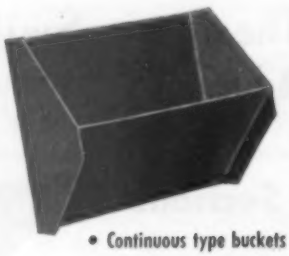
Screen sections of Tyler Woven Wire are fabricated for all makes of vibrating screens in any mesh or metal. They are made up with hook-strip or bent-edge construction to suit the machine on which they are to be used.

Tyler hook-strips make possible stretching and maintaining the screening at drum-head tension, which is essential for successful screening and long screen life.

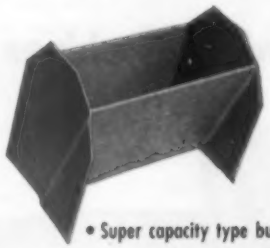
THE W. S. TYLER COMPANY
CLEVELAND 14, OHIO
Manufacturers of Woven Wire Screens and Screening Machinery

RUGGED AND DEPENDABLE AT low cost

• Salem type buckets



• Continuous type buckets



• Super capacity type buckets

Standard high quality steel elevator buckets are available in all styles, types, sizes and gauges for replacement as well as new installations. For real economy and immediate service, get acquainted with the Standard line today.

Write for new catalog showing the complete line of Standard buckets and prices.

The Standard Metal Mfg. Co. SINCE 1921

STANDARD METAL MFG. CO.
111 Center St., Malinta, Ohio

Dealers of the Hyster Co., Portland, Oreg., lift and industrial truck manufacturers, have initiated a written warranty program on used lift trucks similar to those used by leading automobile manufacturers.

Featuring the use of a yellow and black "Hy-Quality" tag, the program is designed to give confidence to small-business buyers. The use of warranted used trucks will permit, also, a low cost materials-handling experiment or trial of a new materials-handling system.

American Brake Shoe Co., New York, N. Y., announces the opening of a new sales and technical service office in Duluth, Minn.

John V. Houston Jr., of Brake Shoe's Headquarters Division in New York, has been assigned to head the new office. Formerly a castings salesman with the company's Brake Shoe & Casting Division, Mr. Houston will concentrate on promoting products and materials.

John V. Houston, Jr.

J. D. Brance

J. D. Brance has been elected president and general manager of Fort Worth Steel and Machinery Co., Fort Worth, Tex. Formerly of Houston, he succeeds J. I. Jackson, who had been with FWSMCO for 25 years.

Mr. Brance, a veteran in the power-transmission machinery field, was formerly executive vice-president, a position he has held since 1947, when FWSMCO merged with the Transmission Machinery Co. of Dallas.

Baldwin-Lima Hamilton Corp., Construction Equipment Division, Lima, Ohio, announces the appointment of Bradley Equipment Co., 1042 West Marietta St., N. W., Atlanta, Ga., as the distributor for LIMA equipment in the central and northeastern portion of Georgia.

Brunner & Lay Rock Bit Corp. has awarded a contract to the Dillard Co. for the construction of a new plant and warehouse, totaling 20,000 sq. ft. on a 5-acre plot. The location of the new plant will be on Sweeten Creek Road, Asheville, N. C. Work will begin immediately.

Gilson Testing Screen

The GILSON Screen cuts out error and guesswork in meeting sizing specifications for crushed stone, gravel, slag, coal, ores, and similar materials.

You can own and maintain a GILSON Screen for only 85-cents per 1,000-tons production in your plant, according to our sales and service records.

For Research Projects, too — the GILSON Screen is the answer to moderate-scale mass separation jobs.

WHY THE GILSON SCREEN?

1. Makes test quickly and accurately
2. Two to seven separations simultaneously
3. Screen trays independently removable
4. Trays balanced to same tare weight
5. Visible separation to refusal
6. Few moving parts
7. Sturdy construction
8. Size range 4" to 200-mesh

GILSON SCREEN CO.
MALINTA, OHIO

USED! HEAVY EQUIPMENT

D13000 Engine, 9J Series-"Y" Arrangement. This engine has not been subject to dust as it has been used on sand boat; "as is," but in good operating condition. J-64.
At Topeka . . . BUY & TRY 2,250.00

D13000 Engine, 4S Series—"X" Arrangement. Good operating condition. Master clutch recently rebuilt. J-62.
At Topeka.....BUY & TRY 2,500.00

Gardner-Denver Wagon Drill, Model D783D. Late model; rebuilt in our shop. J-85. At Topeka . . .
CERTIFIED BUY.....1,200.00

General Hoe Boom Assembly. From No. 310 Shovel; can be used on Model 320. Used only 3 months. like new! J-99.
At Topeka 1,7850.00

Your "Caterpillar" dealer is the best place to buy equipment —new or used.

MARTIN TRACTOR COMPANY
CHANUTE • TOPEKA • CONCORDIA
3202 S. Topeka Blvd. Topeka, Kansas

The Pecaut Equipment Co. of Sioux Falls, S. D., has been appointed distributor for the sale and servicing of General Motors Detroit Diesel engines for the entire state of South Dakota.

Headed by S. F. Pecaut, the company has operated in the state since 1936. Darrel Pecaut will head the diesel activity as salesmanager with William Taylor as service manager and Robert Schuknect as parts manager.

S. F. Pecaut

Don Gugler

Don Gugler has been appointed district sales representative by Iowa Manufacturing Co., Cedar Rapids, Iowa. His territory will include Michigan, Ohio, Indiana, West Virginia, Kentucky, and west Pennsylvania, with headquarters in Columbus, Ohio.

Originally employed by Iowa Manufacturing Co., in 1943, he has come up through the ranks of Iowa employees, serving in various departments to become well grounded in the basic fundamentals of the industry.

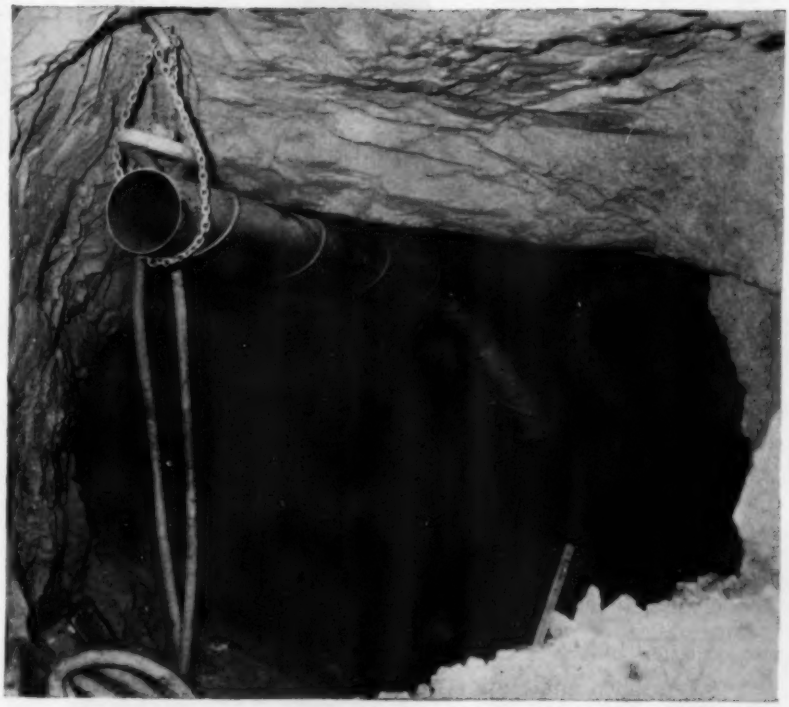
Leonard R. Constantine has been appointed plant manager of the Catasauqua, Pa., plant of the Fuller Co.

Mr. Constantine was graduated from Lehigh University in 1943 and was employed as a junior engineer with the Dravo Corp. of Wilmington, Del. From 1945 to 1947 he was assistant welding engineer for the M. W. Kellogg Co. (he was later appointed to the position of welding engineer for The Elliott Co.).

Donald C. Burnham, an authority on industrial manufacturing techniques, has joined the Westinghouse Electric Corp., Pittsburgh, Pa., as vice-president in charge of manufacturing. He succeeds T. I. Phillips, who is retiring after 39 years of service.

Mr. Burnham comes to Westinghouse from the General Motors Corp., where he has recently held the positions of manufacturing manager and assistant chief engineer of the Oldsmobile division.

PIPE WITH A "ONE-TWO" PUNCH



Naylor light-weight pipe is your best bet to "knock out" gas, fumes, and stale air in underground operations. In push-pull ventilation, it gives you a "one-two" punch that can't be matched in the light-weight class because no other light-weight pipe has Naylor's exclusive lockseamed-spiralwelded structure. The extra collapse strength provided by this structure makes it possible to build Naylor vent pipe of lighter gauge material without any sacrifice of performance. Other savings are assured through use of the Naylor one-piece Wedge-Lock coupling — the quickest possible connection available today. Write for Bulletins No. 507 and No. 514 to get the full story on this unbeatable Naylor combination.

NAYLOR PIPE

Naylor Pipe Company • 1257 East 92nd Street, Chicago 19, Illinois

Eastern U.S. and Foreign Sales Office: 350 Madison Avenue, New York 17, New York

Cut your handling time with

WELLMAN-WILLIAMS

REHANDLING BUCKETS

WELLMAN-WILLIAMS Material Handling Buckets open and close faster. Their *smooth scoops* discharge the material quickly. *Double hinge shaft* construction enables them to cover larger areas for bigger loads. *Extra wide scoops* cut time on cleanup operations.

WELLMAN-WILLIAMS BUCKETS—built to dig and last while digging.

THE WELLMAN ENGINEERING CO.

CLEVELAND 4, OHIO

Mail coupon for free bulletin

The Wellman Engineering Company
7042 Central Avenue, Cleveland 4, Ohio

Please send me a free copy of bulletin on:

☐ Clamshell Buckets ☐ Stone Grabs
☐ Dragline Buckets ☐ Log Grabs

Your Name_____

Address_____

City_____ State_____

Position_____ Company_____

C. W. Schweers, vice-president and director of sales of Allis-Chalmers General Machinery Division, has announced the following appointments to his staff:

O. V. Tally, director of industrial sales; J. S. Morgan, director of utility sales; and W. L. Manly, director of general purpose equipment sales.

Announcement was also made of the formation of a new Northwest region under the management of M. M. York, formerly New England regional manager. Headquarters will be in Chicago, Ill.

J. H. Burrus Jr., formerly Milwaukee district office manager, has been named manager of the Midwest region, succeeding Mr. Tally, who held the post since 1950. Headquarters are in St. Louis, Mo.

John E. Smet, formerly manager of the Hartford district office, was appointed manager of the New England region, succeeding Mr. York.

McLanahan & Stone Corp, Hollidaysburg, Pa., recently signed a contract with the Aggregates Equipment Co. of Lancaster, Pa., for the distribution of McLanahan's complete line throughout the state of Pennsylvania. F. M. McCorkel is president of the company. At present six salesmen cover the state for McLanahan & Stone.

Appointment of W. J. McClure as Northwestern district manager of the Davey Compressor Co. has been announced. He was formerly affiliated with International Harvester Co., The Buda Co., and Cummins Northwest Diesel Sales, and is a member of the Governing Board, Northwest Section, Society of Automotive Engineers. In his new position, Mr. McClure will be in charge of Davey's compressor and air tool sales in the Pacific Northwest. His headquarters will be in Seattle, Wash.

Three executives of Bemis Bro. Bag Co., each with 50 years of service with the company, were honored in Chicago recently by a group of Bemis officers and executives.

C. F. Scott, who became a member of the board of directors and was for many years manager of the Bemis Kansas City plant, is still active in company affairs as a counsellor.

E. R. Bailey is active as manager of the Bemis San Francisco, Calif., plant.

R. H. Brown, manager of the Bemis New Orleans plant until 1948, and since then a special representative of the company, retired on March 31 of this year.

Kenneth O. Williamson, formerly assistant sales manager, has been appointed sales manager for Osgood-General, Marion, Ohio, succeeding James S. Fortiner, who has resigned. He became associated with the company during 1941, in the production department. Before his appointment as assistant sales manager in 1950, he served as division sales manager in several territories.

Osgood-General also announces that consolidation of the General Excavator Co. has now been completed, with the transfer of all production facilities to the Osgood plant.

K. O. Williamson

Donald L. Shirley

Donald L. Shirley has been appointed district sales manager for the Seattle, Wash., area by Link-Belt Co., Chicago, Ill. His headquarters will be at the company's Seattle plant, 3405 Sixth Avenue, South.

Mr. Shirley has been with Link-Belt from 1914 to 1944. He started in the Seattle office and later was transferred to the company's chain plant in Indianapolis. After serving in sales at the Philadelphia and Seattle offices, he was appointed manager of the Portland office.

Appointment of Schweigers, Inc., Watertown, S. D., as distributors in South Dakota of Galion Allsteel hydraulic hoists and dump bodies, is announced by The Galion Allsteel Body Company, Galion, Ohio.

The company will offer complete parts and repair service as well as handling new equipment sales.

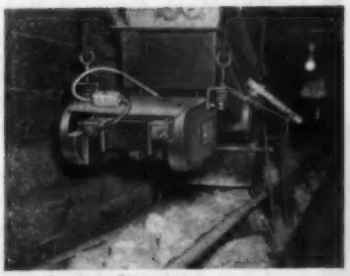
Hammermills, Inc., subsidiary of Pettibone Mulliken Corp., Chicago, Ill., announce the transfer of sales, engineering, and manufacturing of the complete line of Bulldog Hammermills to 625 C Avenue, N.W., Cedar Rapids, Iowa, where these operations will be carried on with the Universal Engineering Corp.

Thomas H. Brumagin was elected to the board of directors of the Ajax Flexible Coupling Co. Inc., Westfield, N. Y. Mr. Brumagin is chief engineer and has been associated with Ajax since 1946.

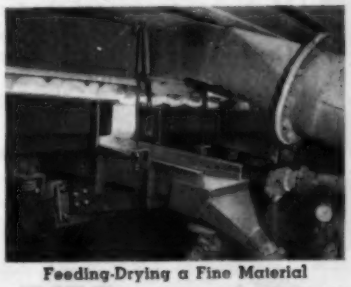
SYNTRON

"Vibra-Flow"

VIBRATORY FEEDERS PROVIDE



Feeding Limestone



Feeding-Drying a Fine Material

Feeding Sinter in a Mill

Feeding Frit to Bag Filler

- INSTANT CONTROL of rate of flow from pounds to hundreds of tons per hour.
- EFFICIENT, low cost operation—due to electromagnetic vibratory principle — using no motors, gears, belts, sprockets, etc.
- FLEXIBILITY in handling most bulk materials —hot or cold, dry or damp, fine or coarse.
- ADAPTABILITY to your present processing system with a minimum of change.
- A VARIETY of sizes and styles—light tonnage feeders with capacities from one to ten tons per hour—or heavy tonnage feeders with capacities up to hundreds of tons per hour—with flat pan, tubular, grizzly, screening and many other types of troughs.
- SYNTRON engineers, with years of experience in material handling problems, are ready to assist you by recommending the proper Syntron Feeder for your problem.

Write for Catalog Data

SYNTRON COMPANY

385 Carson Avenue Homer City, Penna.

FARREL-BACON
JAW CRUSHERS
SIZES 60" x 48" to 10" x 7"
Optional design features include: (1) Meehanite frame, sectionalized when necessary; (2) removable water-cooled bearings; (3) improved design of swing-jaw bearing; (4) force-feed oil lubrication, or circulating system if desired; (5) split flywheels; (6) flat or V-belt drive. Write for further details or engineering assistance.
FARREL-BACON
ANSONIA, CONNECTICUT

Ground has been broken for a new branch factory to be erected at 399 Preda Street, San Leandro, Calif., by The Foxboro Co., Foxboro, Mass. A new Dallas, Texas, factory, recently completed, is serving industries of the South and Southwest. In addition, a site has been selected and construction started for a new Pittsburgh, Pa., factory to be completed in the near future.

The Webb Corp. of Webb City, Mo., has been licensed to manufacture, sell, and distribute the Reed line of welding fixtures and metal forming equipment formerly built by Reed Engineering Co., of Carthage, Mo.

The Reed line will now be manufactured by the Reed Equipment Division of The Webb Corp.

Clark Equipment Co., Buchanan, Mich., has announced the formation of a new subsidiary, Clark Leasing Corp., to finance leasing of its equipment on a national basis.

Establishment of the subsidiary offers a low-cost equipment leasing plan, under a bank-financed arrangement. The lease program is not intended to promote the leasing of equipment in preference to outright purchase.

Kaiser Chemicals Division, Oakland, Calif., has established a new technical sales department with George C. Davis Jr., as technical sales manager. The department will develop, co-ordinate, and disseminate technical product and application information for its line of basic refractory and chemical products.

As manager of this department, Mr. Davis will also be responsible for customer flow of technical sales information and for the introduction and promotion of all new products in both domestic and export fields.

George C. Davis, Jr.

William A. Roman

William A. Romain has been elected president of Sherman Products, Inc., Royal Oak, Mich., to fill the vacancy caused by the recent death of the firm's founder, George B. Sherman. W. F. Beckman was named vice-president and Vincent J. Crampton, secretary-treasurer. Mrs. Janet M. Sherman was elected to the board to fill the vacancy left by the death of her husband.

Acquisition of the locomotive crane division and plant of The Browning Crane & Shovel Co. of Cleveland, Ohio, has been announced by The Wellman Engineering Co., Cleveland, Ohio. Browning had been in the locomotive crane business since 1899.

The organization will be known as the Wellman-Browning Locomotive Crane Division of The Wellman Engineering Company, with headquarters at 7000 Central Avenue, Cleveland 4, Ohio.

Joe H. Serkowich, advertising manager of LeTourneau-Westinghouse Co., Peoria, Ill., subsidiary of Westinghouse Air Brake Co., has been named director of advertising and publicity for the parent company.

This is a newly created office to effect the co-ordination of advertising programs, sales promotion, and public relations of all the divisions and subsidiaries of Westinghouse Air Brake. Mr. Serkowich will be located in the executive offices in Pittsburgh.

FLEXCO®

BELT FASTENERS and RIP PLATES

FOR HEAVY CONVEYOR AND ELEVATOR BELTS OF ANY WIDTH

★ FLEXCO Fasteners make tight butt joints of great strength and durability.
★ Trough naturally, operate smoothly through take-up pulleys.
★ Distribute pull or tension uniformly.
★ Made of Steel, Monel, Stainless, Everdur. Also Promal top plates.
★ FLEXCO Rip Plates are for bridging soft spots and FLEXCO Fasteners for patching or joining clean straight rips.

Compression Grip distributes strain over whole plate area

Order From Your Supply House. Ask for Bulletin F-100

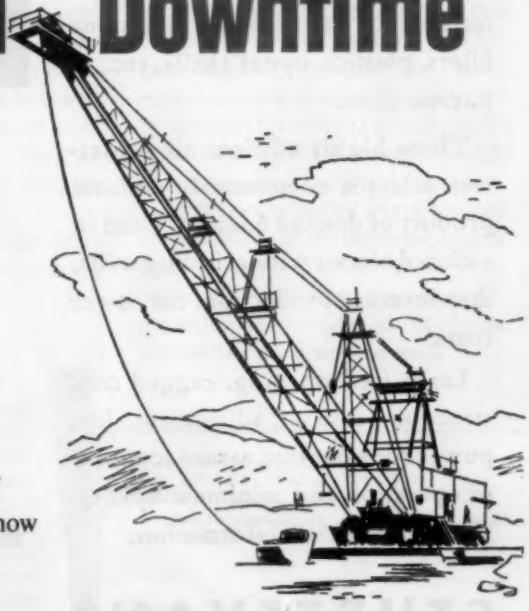
FLEXIBLE STEEL LACING CO., 4623 Lexington St., Chicago 44, Ill.

Double Proof of Sinclair Savings!

10,000 Hours without Overhaul

Sinclair TENOL® kept a Diesel-powered Shovel in top operating condition 10,000 hours without overhaul.

No Lubrication Downtime in Two Years!



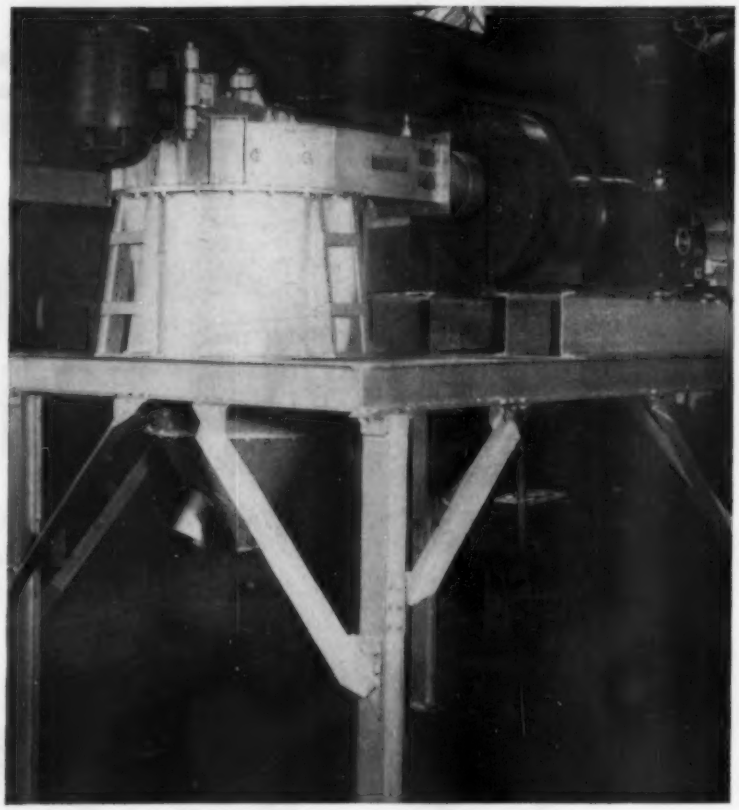
Sinclair JET LUBRICANT kept a Bucyrus-Erie Drag Line lubricated 24 hours a day, 7 days a week with no lubrication downtime in 2 years.

● Wherever wheels turn or friction must be lessened, a Sinclair lubricant can improve your operations. Your Sinclair Representative will show you where and how. Write or phone him, or write Sinclair Refining Company, 600 Fifth Avenue, New York 20, N. Y.

SINCLAIR LUBRICANTS

NEW TYPE STURTEVANT AIR SEPARATOR

Recovers Fines in Micron Ranges



Now the famous Sturtevant Whirlwind Air Separator, so widely used throughout industry for fast recovery of fines, has been specially designed to "pick-off" classified materials such as pigments, limestone fillers, plastics, oyster shells, etc., in micron sizes.

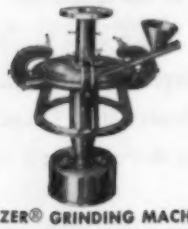
These highly efficient air separators select a continuously uniform product of desired fineness. Used in a closed circuit with grinding mills, they increase production, cut power costs.

Large feed opening, rugged construction, ease of adjustment, low power consumption assure economy of operation and minimum upkeep. Write for further information.

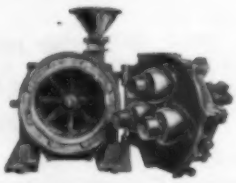
STURTEVANT
MILL COMPANY
104 CLAYTON STREET
BOSTON 22, MASS.

Designers and Manufacturers of:
CRUSHERS • GRINDERS • SEPARATORS
CONVEYORS • MECHANICAL DENS and
EXCAVATORS • ELEVATORS • MIXERS

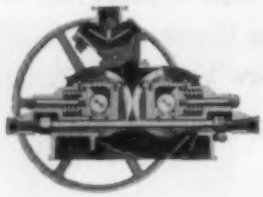
OTHER STURTEVANT EQUIPMENT



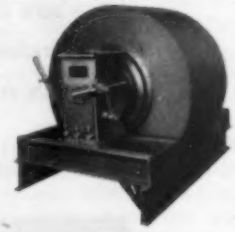
MICRONIZER® GRINDING MACHINE
A fluid jet grinding machine, the Sturtevant Micronizer speeds reduction of materials to low micron sizes. These jet mills are especially applicable in fields where a particle size in microns is desired.
Sturtevant Micronizer grinding machines are available in many sizes and capacities.



RING-ROLL MILLS
For medium and fine reduction (10 to 200 mesh), hard or soft materials. Very durable, small power. Operate in closed circuit with Screen or Air Separator. Open door accessibility. Many sizes. No scrapers, plows, pushers, or shields.



CRUSHING ROLLS
For granulation, coarse or fine, hard or soft materials. Automatic adjustments. Crushing shocks balanced. For dry or wet reduction. Sizes 8 x 5 to 38 x 20. The standard for abrasives.



BLENDER
Four-way mixing action assures a thoroughly blended product. Open-door accessibility permits easy cleaning. Available in many mixing capacities for ¼-ton per hour and up.

MORE GRINDING PER PLATE... REDUCED COST PER TON...

with USS Lorain Rolled Plate Linings

MADE from top-grade *rolled steel*, Lorain Linings have far greater wearing life than regular cast linings. Their outstanding strength makes possible the use of thinner sections, saves first cost of metal . . . increases usable diameter of the mill, boosts output. The tight joints between ends of plates and close fit between plates and lift bars eliminate shell wash and allied troubles.

No matter what you grind, USS Lorain Rolled Plate Linings will produce better grinding results, more economically. They're made in easy-to-handle sections that save hours of installation time. They keep mill down-time to a minimum. They're so rugged they'll wear 'til they're paper thin without failing!

The Liner Plates of Lorain Linings are made symmetrical and interchangeable. Severe localized wear at feed or discharge end can be balanced by heat-treating. The lift bars, carefully designed to insure correct cascade action, are available in different lift heights to suit conditions. Lift height will remain approximately constant for life of the lining.

USS Lorain Rolled Plate Linings are available—in the diameter, length and thickness best suited to your operating conditions—through leading mill manufacturers whose names will be furnished upon request.

USS GRINDING BALLS are carefully made of special composition steel to take long, rough wear evenly. Samples from each production lot are thoroughly tested to make sure of surface hardness and maximum hardness penetration. They come in eleven sizes from ¾" to 5". For further information just return the coupon at the right.

United States Steel Corporation
Room 4374, 525 William Penn Place
Pittsburgh 30, Pa.

Without obligation on my part, please send me your FREE booklet on USS Grinding Balls.

Name .....

Company .....

Address .....

City ..... State .....

UNITED STATES STEEL CORPORATION, PITTSBURGH · COLUMBIA-GENEVA STEEL DIVISION, SAN FRANCISCO · TENNESSEE COAL & IRON DIVISION, FAIRFIELD, ALA.
UNITED STATES STEEL EXPORT COMPANY, NEW YORK

USS LORAIN ROLLED PLATE LININGS *and* USS GRINDING BALLS

4-463

UNITED STATES STEEL

SINCE 1856
HUMBOLDT
Mines Equipment, Mineral Dressing Plants, Crushing and Grinding Machinery, Cement Factories, Metallurgical Works, Coal Preparation Plants, Steel Constructions for Buildings and Bridges.
SINCE 1864
DEUTZ
Otto-, Gas-, Diesel-Engines for Every Purpose of Two- and Four-Stroke design, Output range 3-1650 H.P.. Cooled by water or air, Diesel-powered tractors, Diesel locomotives, Gas producer plants.
SINCE 1864
MAGIRUS
Trucks and busses driven by air-cooled DEUTZ Diesel engines, Vehicles for municipal services, Fire ladders, fire engines, Fire fighting water trucks, Two-wheeled ladders, Fire fighting equipment.
KLÖCKNER-HUMBOLDT-DEUTZ AG · KÖLN

KLOCKNER-HUMBOLDT-DEUTZ A.G. KÖLN-DEUTZ, GERMANY

a new PAYLOADER®

LOOKS THE SAME... BUT DOES MORE WORK

Four-wheel-drive • Torque converter • 4-speed, full-reversing transmission • Power-steering • Hydraulic brakes Quick tip-back bucket • Automatic bucket positioning.

MODEL **HRC**

CAPACITY
1 CU. YD. STRUCK-LOAD
1⅛ CU. YD. PAYLOAD

HERE IS THE FINEST tractor-shovel for its size ever built. It has undergone extensive field testing that proves it is without equal in work output, versatility, ruggedness and ease of operation. Its unique combination of torque converter drive and Hough four-speed, full-reversing transmission provides "just-right" speeds, forward and reverse, for every job — plus smooth, shockless power flow at all times.

Your "PAYLOADER" Distributor is eager to explain ALL the advantages of the Model HRC and show what it will do for you.

THE FRANK G. HOUGH CO.
Libertyville, Illinois

Please send me more information on the new HRC

NAME.....

TITLE.....

COMPANY.....

STREET.....

CITY..... **STATE**.....

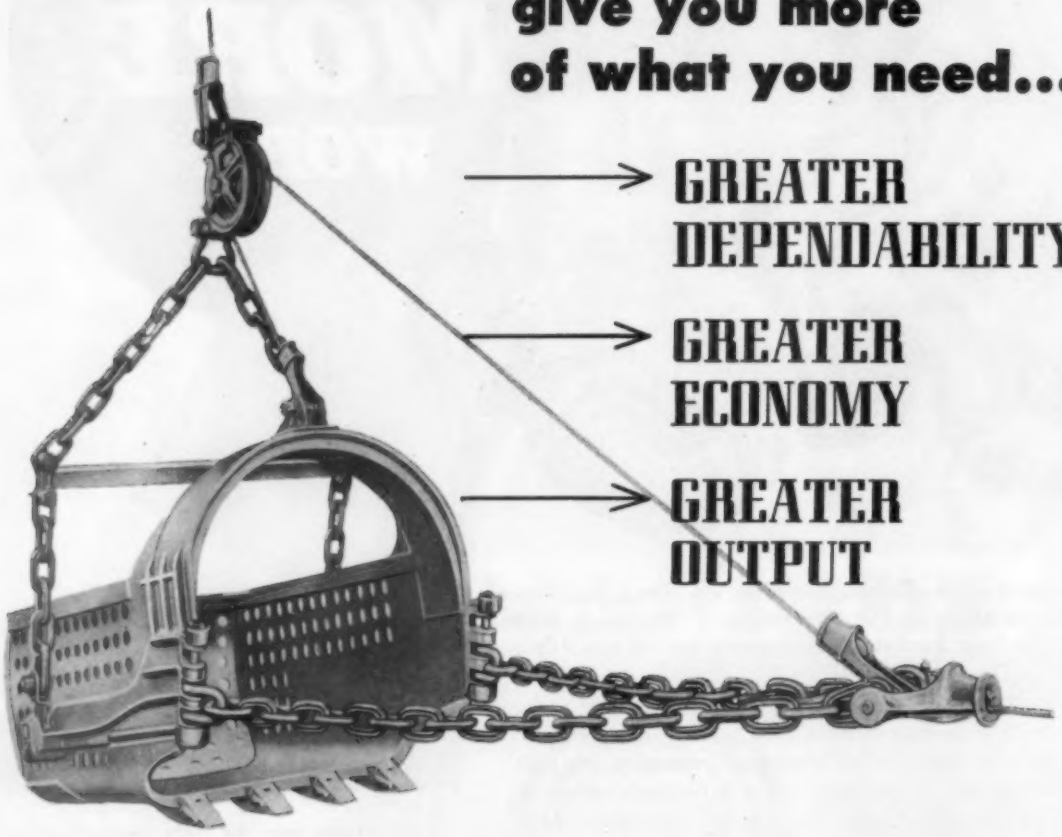
☐ **Please have Distributor call**
☐ **Send information on all seven PAYLOADER models**

750

PAYLOADER®
THE FRANK G. HOUGH CO. • LIBERTYVILLE, ILL.

HENDRIX
DRAGLINE BUCKETS

give you more of what you need...



→ GREATER DEPENDABILITY

→ GREATER ECONOMY

→ GREATER OUTPUT

⅜ to 40 Cubic Yards

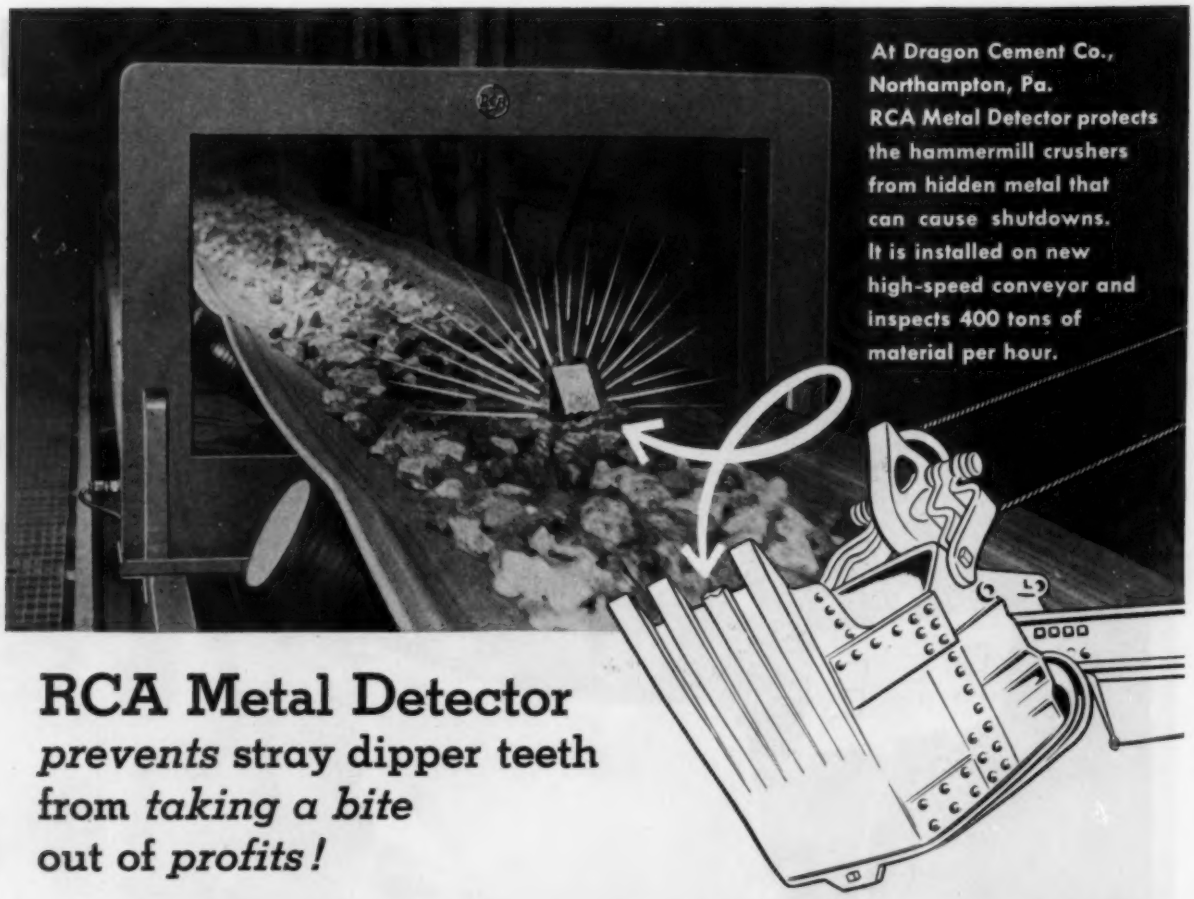
Hendrix Lightweight Dragline Buckets

A TYPE AND SIZE FOR EVERY DIGGING PURPOSE

Hendrix Buckets available without perforations on special order.

HENDRIX MANUFACTURING CO., Inc.

MANSFIELD, LOUISIANA



At Dragon Cement Co., Northampton, Pa. RCA Metal Detector protects the hammermill crushers from hidden metal that can cause shutdowns. It is installed on new high-speed conveyor and inspects 400 tons of material per hour.

RCA Metal Detector
prevents stray dipper teeth from *taking a bite* out of *profits!*

It actually *"looks through"* cement rock and limestone to ferret out tough steel fragments such as manganese steel dipper teeth which can cripple a crusher and cause production to l-i-m-p or stop dead.

Wired to sound an alarm, spray-mark a metal area or stop a conveyor whenever trouble threatens, the RCA Electronic Metal Detector inspects materials moving at speeds from 25 feet to 1,000 feet per minute . . . magnetic and non-magnetic. It's on the job every moment of the time, sleuthing the conveyor line for metals and alloys! They may escape human inspection, but not the electronic field of the Metal Detector!

By saving high-cost crusher replacements and by cutting down-time and production losses, the RCA Metal Detector on your conveyor can quickly pay for itself. Service and installation facilities of the RCA Service Company are at your command, from coast to coast. Why not get the full story? Use coupon.

Thousands of dollars in SAVINGS—that's the Big Story at industrial plants using RCA Metal Detectors.

RADIO CORPORATION of AMERICA
CAMDEN, N. J.
In Canada: RCA VICTOR Company Limited, Montreal

Radio Corporation of America
Dept. 236-G, Building 15-1, Camden, N.J.
Please send me information on the RCA Electronic Metal Detector.

NAME_____ TITLE_____
ADDRESS_____
COMPANY_____
CITY_____ ZONE____ STATE_____

Even a Boy can fight Communism with Truth

Kids on Radio Free Europe Send Hope To Pals Behind Iron Curtain

Twelve-year-old Karel Paces, a young Czech found in a German refugee camp, is broadcasting over Radio Free Europe to his Czech friends behind the Iron Curtain.

He is telling them familiar children's stories in their native tongue—stories now denied them by their Communist masters. These stories have a very real meaning to Karel's friends, a meaning ingrained in the folklore of their country.

Karel Paces is giving his friends, the boys and girls of his beloved Czechoslovakia, the truth of their own country and the free world. It is this truth which every American must support now so that it can be used to fight the deceit, darkness and despair which Communist tyranny is spreading through the satellite countries of Europe.

Day and night, Radio Free Europe is exposing Communist lies and propaganda, and sustaining the hope of oppressed millions that some day they will live in a better world.

At least $4,000,000 is needed this year to support and expand the operations of Radio Free Europe and Radio Free Asia. In addition, the Crusade for Freedom is seeking the signatures of Americans, on Freedom-Grams. These will be your personal pledges of hope for a free world.

This Crusade cannot succeed without your help. Your contribution is needed *now* to help support Radio Free Europe and Radio Free Asia . . . to help fight red lies with truth and to win the cold war.

Support this truth campaign now and help bring to millions the promise of future freedom.

Send your contribution to Crusade for Freedom, c/o your local Postmaster

Help Truth Fight Communism
Give To Crusade For Freedom

Contributed in the public interest by

Pit and Quarry Publications, Inc.

3 MURPHY DIESELS

furnish economical, dependable power for Dillon Stone Co.

ANY CRUSHING OPERATION is well-powered when it's Murphy Diesel powered. At the Dillon Stone Co., Columbus Junction, Iowa, a 190 H. P., continuous, Murphy Diesel powers the Cedarapids double impeller impact breaker primary. A 190 H. P., continuous, Murphy Diesel powers the Cedarapids portable hammer-mill secondary crushing and screening unit. A 110 K. W. Murphy Diesel Generator Set (mounted in a truck) supplies electricity for motors on the secondary unit, the portable screening plant and the bins. Here is a crushing operation that takes full advantage of Murphy Diesel's economy of operation, long life and rugged dependability.

You can have these same advantages working for you in your plant whether it's portable or stationary. Just call your Murphy Diesel Dealer. He'll give you full information on how Murphy fits your needs.

MURPHY DIESEL COMPANY
5307 W. Burnham St.
Milwaukee 14, Wisconsin
Sales, parts, service throughout the nation.

MURPHY DIESEL

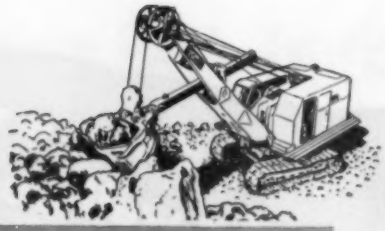
283

Heavy duty power

for rock crushing

Murphy Diesel Engines and Power Units are available in sizes from 90 to 240 H.P. Engine speeds are 1200 and 1400 rpm. "Packaged" generating units are available with capacities ranging from 60 to 154 K.W.

Bucyrus-Erie Excavators



LOAD ON THE DOUBLE

In ROCK or DIRT

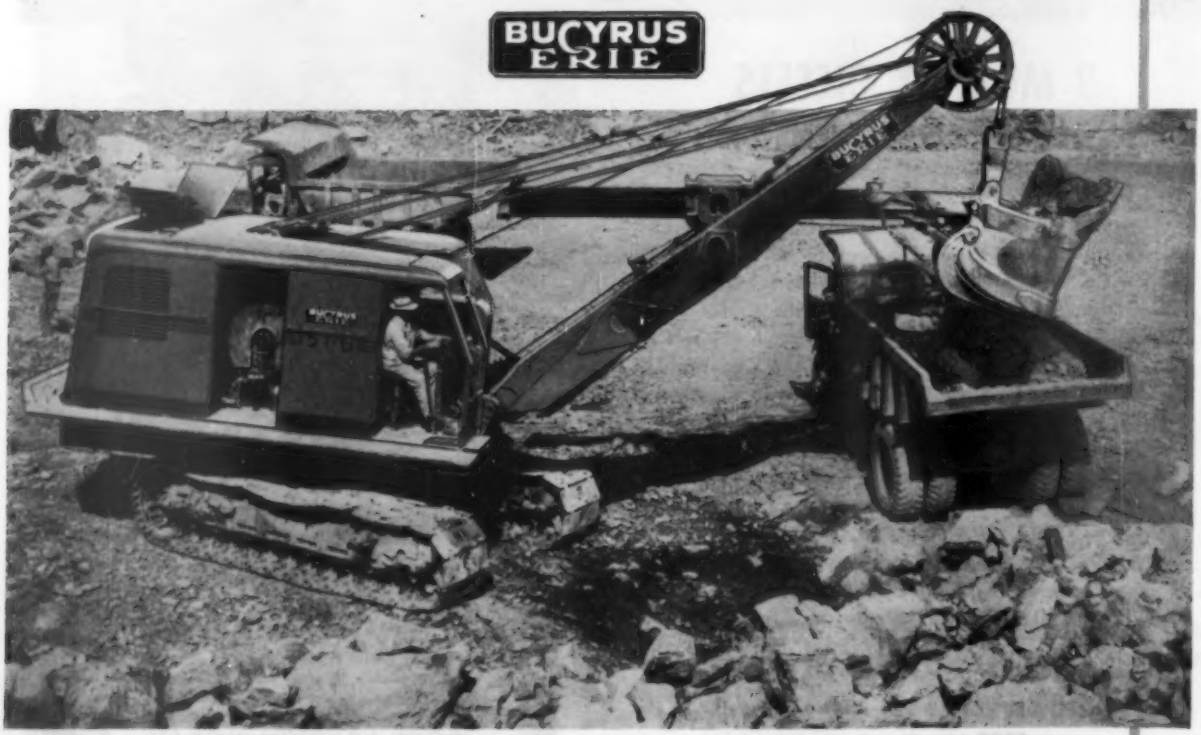
Bucyrus-Eries load fast, even in the toughest digging, because they are built to deliver maximum power and speed. Each model in the Bucyrus-Erie line features individual design from treads to boom point for maximum efficiency in its particular work range. Front end, main machinery, power unit, and mounting are all matched to dipper capacity.

Each part carries its proper share of the work load, and each is designed to operate at peak efficiency well with safe limits. Maintenance costs are low, excavator life high. There's no excess weight to waste power or to slow down performance. With all components properly balanced, Bucyrus-Eries work faster, harder, longer.

If your pit needs call for shovels or draglines with gasoline, diesel, or single-motor electric power in the ⅜- to 4-yard size range, see your Bucyrus-Erie distributor. He can give you complete details on how you can step up production with Bucyrus-Erie excavators.

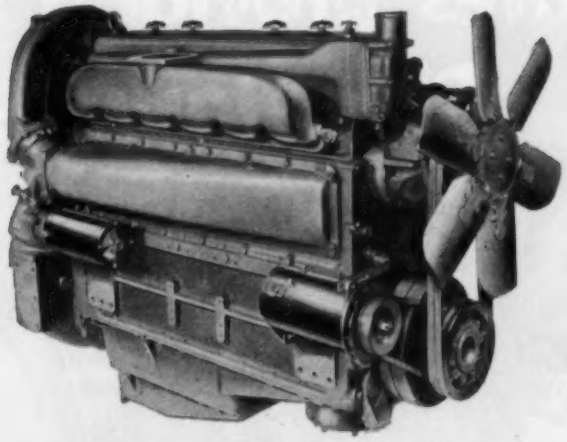
48E54

BUCYRUS ERIE



BUCYRUS-ERIE COMPANY • South Milwaukee, Wis.

NOW 300 HORSEPOWER



in GM "6-110" diesel engine

Improved Design Gives Still More Power Per Pound From Same Size Unit

Want more power—and production—from your heavy-duty equipment?

Stymied because you can't fit a higher-horsepower Diesel into your units?

Now you can get the power you need—and the increased production you want—with a new 300-horsepower General Motors "110" Diesel—the engine that delivers more torque in the working range. And, you can get them with no increase in engine size or weight.

Higher horsepower means faster operating speeds—high torque means more working power—for operators of all kinds of heavy-duty units.

In off-highway trucks this combination means better hill-climbing, more trips per day, bigger pay loads.

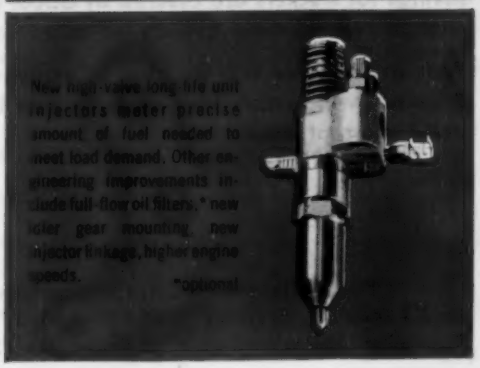
In shovels it means faster digging and loading, more yardage, lower maintenance costs.

In drilling rigs it means more hole per day, faster round trips.

In tractors it means more power for pulling, pushing or "dozing."

Get full details on the new, more powerful GM Series 110 Diesels from your GM Diesel distributor. Have him show you that GM Diesels cost less to buy, less to run and less to maintain than any other Diesel.

New "Figure 8" cylinder liner design gives freer "breathing," better fuel-air mixing for more complete combustion and higher engine efficiency.



New high-valve long-life unit injectors meter precise amount of fuel needed to meet load demand. Other engineering improvements include full-flow oil filters,* new idler gear mounting, new injector linkage, higher engine speeds.

*optional

GM GENERAL MOTORS DIESEL POWER

DETROIT DIESEL
ENGINE DIVISION
GENERAL MOTORS • DETROIT 28, MICHIGAN
Single Engines . . . 16 to 300 H.P. Multiple Units . . . Up to 864 H.P.

Only Eaton 2-Speed Axles have the money-saving features provided by Planetary Gearing

More than two million
Eaton Axles in trucks today!

With Eaton's exclusive planetary design, gear speeds are slower; gear loads are distributed over several gear teeth, holding down stresses and wear. Planetary pinions turn only in the low speed range. In the high speed range they are locked out. The axle then operates as a conventional single-reduction unit. Eaton 2-Speeds are quiet in operation, easy to shift, and run long, trouble-free mileages. Genuine dollars-and-cents savings for truckers are assured by actual performance records representing billions of miles of operation.

Your truck dealer will be glad to explain how Eaton 2-Speeds will enable your trucks to haul more, faster, and longer, at lower cost.

EATON
2-Speed Truck
AXLES

Axle Division
EATON MANUFACTURING COMPANY
CLEVELAND, OHIO

PRODUCTS: Sodium Cooled, Poppet, and Free Valves° Tappets° Hydraulic Valve Lifters° Valve Seat Inserts° Jet Engine Parts° Rotor Pumps° Motor Truck Axles° Permanent Mold Gray Iron Castings° Heater Defroster Units° Snap Rings Springtites° Spring Washers° Cold Drawn Steel° Stampings° Leaf and Coil Springs° Dynamatic Drives, Brakes, Dynamometers

DIAMOND *Single pass*

PORTABLE CRUSHING PLANTS

THESE FEATURES WILL INCREASE YOUR PRODUCTION

- Easily portable
- Centrally located controls
- Low loading height
- Low traveling height
- Light weight
- High production capacity
- Clutch operated feeder
- Oversize vibrating screen
- Sand rejector (optional)
- Power unit plant mounted

Model 124

3 MODELS... capacities from 30 to 70 tons/hr.

Designed for frequent moving, quick set-up and knock-down to give you more efficient crushing *where* you want it—*when* you want it. Ideal for counties and townships, secondary and access road construction, and areas where a high degree of mobility is needed. Low hopper height (10' 4½") gives ease of loading with ½ or ⅜ cu. yd. shovel. Heavy Duty Grizzly openings give higher crusher production with minimum of scalping. Location of wheel bar tongue and short wheel base provides needed maneuverability on road or in pit. Hinged delivery conveyor eliminates dismantling for towing. Mechanical or air brakes and fully guarded drives mean added safety. Adjustable single eccentric plate feeder provides a constant, even flow of pit run material.

Completely modern in every way, the Diamond Portable Crushing Plant is your answer to more efficient crushing.

FREE
Get the facts and specifications. Send for our Bulletin 1000.

IMPORTANT

Diamond's manufacturing, engineering, and sales departments have been transferred from Minneapolis to Chicago. They now function as a division of Goodman Manufacturing Company, fifty-four years a leading manufacturer of heavy equipment for underground mining and tunneling.

Send this coupon

DIAMOND IRON WORKS
DIVISION GOODMAN MANUFACTURING COMPANY
Halsted Street at 48th Place • Dept. 1 • Chicago 9, Illinois

Please send your Bulletin 1000.

DIAMOND

Name_____ Title_____

Company_____

Address_____

City_____ Zone____ State_____

Continuous crushing under heavy rock dust conditions possible only with **KUE-KEN** . . . the crusher with crankcase-type lubrication system!

A Nevada magnesite mine crushes constantly under extremely bad conditions. Heavy layers of rock dust covers the crushers. If the crushers were of the ordinary type, periodic shut-downs would be necessary to replace worn parts. This is not necessary with Kue-Ken and is one reason why Kue-Ken crushers are used exclusively!

Kue-Ken is the only crusher in which dust is sealed out and the internal mechanism operates in a bath of clean, cool oil. No wonder that after starting with one Kue-Ken crusher, this Nevada magnesite plant now has six in daily operation! The trouble-free operation of Kue-Ken crushers provides this plant with the lowest cost-per-ton crushing!

Regardless of your crushing conditions, you will get more for your crushing dollar with Kue-Ken. Investigate Now!

KUE-KEN CRUSHERS

"LOWEST COST-PER-TON CRUSHING"

Jaw Crushers · Gyratory Crushers · Overhead Eccentric Crushers · Revolving Screens
Classifiers · Feeders · Rib Cone Ball Mills · Concentrating Tables · Vibrating Screens

Write for catalogs

STRAUB MFG. CO. 8383 BALDWIN • OAKLAND, CAL.

DEALERS: **LUND MACHINERY CO.**, Salt Lake City, Utah; **CLOSNER EQUIPMENT CO.**, San Antonio, Texas; **WASHINGTON MACHINERY CO.**, Seattle, Wash.; **CONSTRUCTION EQUIPMENT CO.**, Spokane, Wash.; **CONTRACTORS EQUIPMENT CO.**, Portland, Ore.; **MILLER MACHINERY CO.**, Missoula, Mont.; **GARLINGHOUSE BROS.**, Los Angeles, Calif.; **ANAHUAC MACHINERY CO.**, Mexico City, Mexico; **UNIVERSAL EQUIPMENT CO.**, Vancouver, B. C.

Pennsylvania Crusher Co., Exclusive Licensed Eastern Manufacturer and Distributor, 323 S. Matlack St., West Chester, Penn.
Armstrong Whitworth (Metal Industries) Ltd., Authorized Licensed Manufacturer and Distributor. Close Works, Gateshead-upon-Tyne 8, England

"We're Bustin' Up Those Big Rocks Now!"

California company reports INTERNATIONAL U-450 gasoline engine has power to crush bigger rocks than ever before possible.

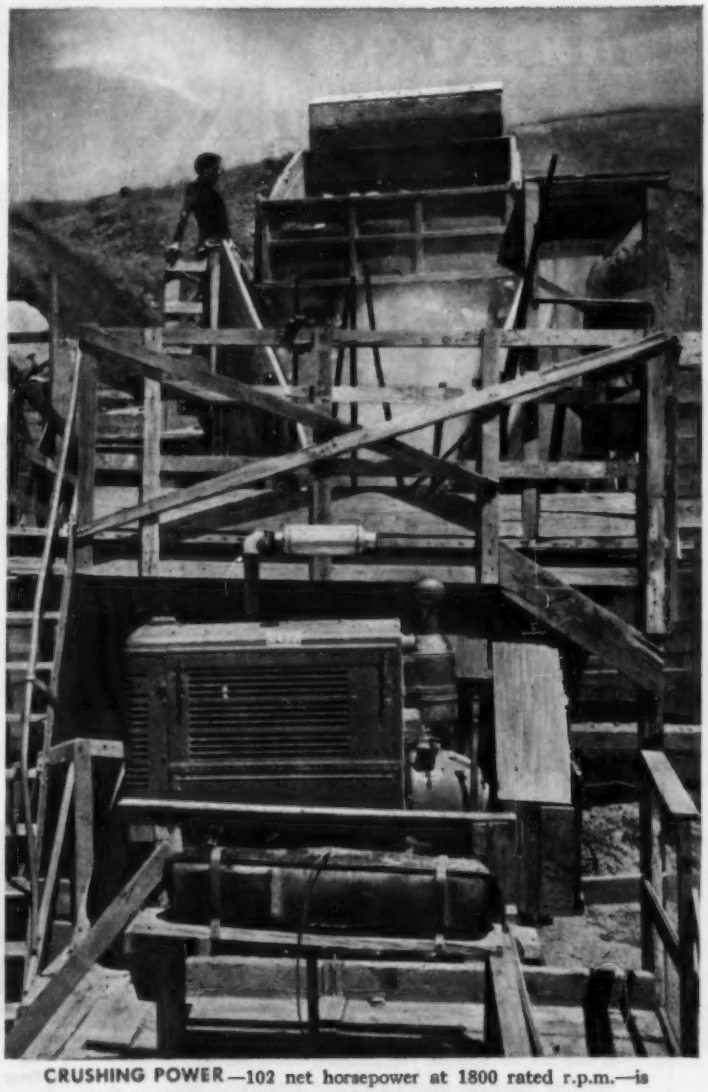
The Goddard brothers of Hayward, California, don't worry about the size of rocks they dump in the hopper of their crushing plant, since they replaced an old engine with a new INTERNATIONAL U-450 power unit.

Owner John Goddard spells out the transformation this way: *"We're bustin' up those big rocks now. It's all because of our new engine—the INTERNATIONAL U-450. She's loaded with power and could easily double our current production of 500 tons daily if we could only get more rock."*

The U-450 is one of the seven new carbureted engines recently added to the INTERNATIONAL line which now includes 18 models—diesel, gasoline and gas—ranging from 16.5 to 200 net horsepower.

There's a size for every quarry or pit operation, and you can get expert assistance in cutting your power costs and stabilizing your production by seeing your INTERNATIONAL Industrial Distributor or Power Unit Dealer today. He'll give you the low-down on the dividends you can expect from INTERNATIONAL "Power that Pays."

INTERNATIONAL HARVESTER COMPANY, CHICAGO 1



CRUSHING POWER—102 net horsepower at 1800 rated r.p.m.—is provided by this INTERNATIONAL U-450 gasoline engine.

For everything in Earthmoving

See INTERNATIONAL'S Complete Earthmoving Line

INTERNATIONAL HARVESTER

POWER THAT PAYS

INTERNATIONAL

"If our executives did not read BUSINESS PUBLICATIONS I'd consider them unfit for their jobs"

Col. Willard F. Rockwell,
Chairman of the Board,
Rockwell Manufacturing Company

"We feel the same way about our sales managers," Colonel Rockwell continues. "We expect them to know what is being printed in the business publications and to guide themselves accordingly. Further, we ask our salesmen to keep our home office informed about the comments of our customers on business periodicals."

Like Colonel Rockwell, other business and professional leaders the country over are reading business publications covering their fields of activity. They are getting from these magazines vital information about new products, new methods, new marketing trends, price and distribution changes through the advertising as well as the editorial pages. The Business Press offers a direct route to anyone who has anything to sell to business and professional men.

NBP

For a United Business Press

NATIONAL BUSINESS PUBLICATIONS, INC.

1001 FIFTEENTH STREET, N. W. • WASHINGTON 5, D. C. • STerling 3-7535

The national association of publishers of 161 technical, professional, scientific, industrial, merchandising and marketing magazines, having a combined circulation of 3,524,478 ... audited by either the Audit Bureau of Circulations or Controlled Circulation Audit, Inc.... serving and promoting the Business Press of America... bringing thousands of pages of specialized know-how and advertising to the men who make decisions in the businesses, industries, sciences and professions ... pinpointing your audience in the market of your choice. Write for complete list of NBP publications.

"Your PERMANENTE brick lining in this kiln has smashed all records here for service. The kiln came down after a run of 18 months, 8 days—topping the previous record by 2 months. This is 6 times the life we used to get with 70% alumina."

This report from a leading cement producer is only one of many showing how Permanente Periclase-Chrome bricks dramatically improve hot zone service.

The superior performance of Permanente Periclase-Chrome Brick—designed especially for hot zone linings—is increasing clinker production in kilns all over the country. Let us show you how it can do the same for you!

Call or write *Kaiser Chemicals Division,* Kaiser Aluminum & Chemical Sales, Inc. Regional Sales Offices: *Oakland* 12, California, 1924 Broadway; *Akron* 8, Ohio, First National Tower Bldg.; *Chicago,* 518 Calumet Bldg., 5231 Hohman Ave., Hammond, Indiana.

Send for booklet giving installation procedures and for literature explaining all the advantages of Permanente Periclase-Chrome bricks. Standard brick sizes available, both burned and chemically bonded. Installation service at no extra cost. Complete facilities insure superior service.

Kaiser Chemicals

Pioneers in Modern Basic Refractories

Alumina • Basic Refractory Brick and Ramming Materials • Dolomite • Magnesia • Magnesite • Periclase

They're licked before they start

Super-Tempered Precision Space Screens defy Abrasion, Vibration and Fatigue to do their worst. These durable screens stay tight and give extra long wear on the most punishing jobs because they're made of hard and tough super-tempered steel wire that's precision crimped and woven on powerful hydraulic machines.

Specify Super-Tempered Precision Space Screens and find out how they save you money in less downtime and longer life; greater tonnage output at lower cost. To order, write or phone our nearest sales office.

WICKWIRE SPENCER STEEL DIVISION, Atlanta • Boston • Buffalo
Chicago • Detroit • New Orleans • New York • Philadelphia
THE COLORADO FUEL AND IRON CORPORATION, Denver, Colorado
PACIFIC COAST DIVISION, Oakland, California

SUPER-TEMPERED
PRECISION SPACE SCREENS CF&I
PRODUCT OF WICKWIRE SPENCER STEEL DIVISION
THE COLORADO FUEL AND IRON CORPORATION

1941

WHERE EXPLOSIVES RESEARCH PAYS OFF

To blast 305,000,000 tons of stone and non-metal materials for America's ever-growing construction, road building, and steel industries requires more than 166,000,000 pounds of dynamite annually. Here, as illustrated above, is where explosives research pays off. Note the excellent fragmentation which minimizes secondary blasting . . . the low stone pile which increases and speeds up the production of the shovels.

Such results come not only from specially developed explosives and blasting supplies, but also by using the most modern blasting methods. Hercules' continuous research and extensive knowledge of field conditions are important to economical and efficient blasting in quarrying, coal mining, metal mining, and construction.

HERCULES POWDER COMPANY
INCORPORATED

Explosives Department, 960 King St., Wilmington 99, Del.
Birmingham, Ala.; Chicago, Ill.; Duluth, Minn.; Hazleton, Pa.; Joplin, Mo.; Los Angeles, Cal.; New York, N. Y.; Pittsburgh, Pa.; Salt Lake City, Utah; San Francisco, Cal.

XR53-9

I wouldn't think of ordering screens from anyone but STANDARD!

The man from Mars has learned what most earthmen with pit and quarry interests have known for a long time — Standard Stamping is the best source in the Universe for perforated metal Hammermill Screens, Vibrating and Shaking Screens, and Scalping Screens. But he doesn't need to fuel-up his flying saucer, because he can get immediate delivery from Standard by phoning, wiring, or mailing an order. And if he wants information about sizes, open areas, gauges, and such, he'll find it all in Standard's new free catalog, just as *you* can if you mail this coupon.

mail the coupon today for your free copy of Standard's catalog!

STANDARD STAMPING
AND PERFORATING COMPANY
3131 W. 49th Place Chicago 32, Illinois DEPT. P

GENTLEMEN: Please send me your new catalog showing Standard's complete line of screens and perforated metals for pit and quarry use.

Name _____

Company _____

Address _____

City _____ Zone _____ State _____

TAKE A LOOK AT YOUR HAULAGE COSTS!

excessive? BIG? too much? HIGH? wasteful? HIGH?

16 ft. long trailer dump, capacity of 11½ yd. sides and 16 yd. ends lifted by a twin ram 7" single sleeve twin telescopic hoist.

Call on Galion! Take advantage of up-to-date information on the latest, most efficient dump truck equipment. Let your Galion distributor survey your needs, and make common sense, economical recommendations which will solve your equipment problems — quickly! A-7262

PHONE US TODAY.
You'll get action . . . and satisfaction.

THE GALION ALLSTEEL BODY COMPANY
GALION, OHIO

HETHERINGTON & BERNER

DREDGING PUMPS

performance-proven on the toughest jobs

H&B ESTABLISHED 1887

Hetherington & Berner sand and gravel pumps are available in two general types: *STANDARD*, (4", 6" and 8" sizes) with semi-steel parts, for ordinary working conditions and moderate heads; and *DREADNAUGHT*, (6", 8", 10", 12" and 15" sizes) with manganese steel parts, for heavy duty jobs with stringent head conditions.

Write for Bulletin DP-147.

HETHERINGTON & BERNER INC.
753 Kentucky Ave. Indianapolis 7, Indiana

July 1954

THE CONCRETE MANUFACTURER

A SPECIAL SECTION OF PIT & QUARRY

Edited for Producers of

Concrete Building Units

Pipe

Ready-Mix Concrete

Handling Block With a Fork-Lift Truck at the Concrete Building Units Company's Plant, Kansas City, Mo.

Precast Bridge 2 Miles Long

122-Ton Roadway Slabs Floated into Place with Assembly-line Precision on Bay St. Louis Bridge, Mississippi

119,035 BBLS. LONE STAR AIR-ENTRAINING CEMENT USED

● First conceived as a cast-in-place structure, substantial time and money savings were realized by precasting the roadway of this 4-lane, 10,189-ft. bridge carrying U. S. 90 across the Bay of St. Louis.

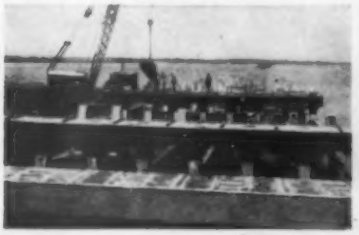
Concrete pile bents on 41-ft. centers support the precast bridge deck. The 2456 concrete piles and 478 half-width roadway units were fabricated at an onshore casting yard near job site.

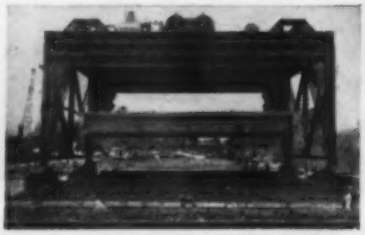
Roadway units, each 27½ x 41 ft., containing 57½ cu. yd. concrete and weighing 122 tons, were moved by gantry to barge, towed to bridge line, and lowered into position by gradually flooding barge ballast compartments.

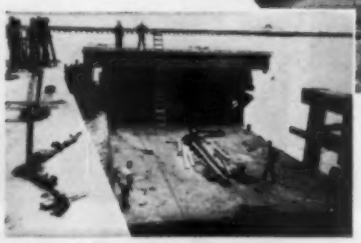
Work on the $6.5-million structure, proceeding from both shores to mid-way juncture, was completed 18 months after driving first pile.

A construction achievement of first rank, made possible by assembly-line precision at every stage—including perfect timing of material deliveries. You could set your watch by dependable schedules on which 119,035 bbls. of LONE STAR AIR-ENTRAINING PORTLAND CEMENT were delivered. The notable workability of this cement helped speed placing and finishing. Extra durability assures long-time, fire-safe service—lowest annual cost.

STATE OF MISSISSIPPI—Toll Project No. 1 (Contract No. 1)
BAY ST. LOUIS BRIDGE, between Bay St. Louis and Henderson Point
Supervision: **MISSISSIPPI STATE HIGHWAY DEPARTMENT**
Designed by: **HAZELET & ERDAL**, Consulting Engineers, Louisville, Ky.
General Contractor: **MERRITT-CHAPMAN & SCOTT CORPORATION**, New York







LONE STAR CEMENTS COVER THE ENTIRE CONSTRUCTION FIELD

LONE STAR CEMENT CORPORATION

Offices: ABILENE, TEX. • ALBANY, N. Y. • BETHLEHEM, PA. • BIRMINGHAM
BOSTON • CHICAGO • DALLAS • HOUSTON • INDIANAPOLIS
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LONE STAR CEMENT, WITH ITS SUBSIDIARIES, IS ONE OF THE WORLD'S LARGEST CEMENT PRODUCERS: 18 MODERN MILLS, 136,000,000 SACKS ANNUAL CAPACITY

The CONCRETE MANUFACTURER

July 1954

Noise in Industry

INDUSTRY is confronted with a new and serious problem which it cannot afford to ignore. This is the problem of noise in industry and its effect on the hearing of employees; and the ready-mixed concrete and concrete building units industries are involved as much as any other. It has long been known that high noise levels over extended periods cause fatigue and inefficiency, cloud judgment, and cause irritability. Every producer knows this but few have done anything about it.

Now the entire subject of noise has become a matter of major concern to industry. Workers by the hundreds are claiming loss of hearing due to noise, and lawyers and labor unions are backing them up. In many of the large industrial states the number of claims for compensation for impairment of hearing has already assumed proportions far in excess of the number of claims filed for silicosis or occupational diseases other than dermatitis. As of several months ago more than 500 claims were under consideration in Wisconsin alone and about two billion dollar's worth of claims had already been filed in this country. Industry has already been held liable for such loss of hearing in two states and probably will be in others. And this, it is said, is only the beginning. Many of these claims are undoubtedly false but many are not.

The real danger behind this problem is the fact that there is no sure way to determine the extent of permanent damage to the hearing of an individual or the amount of impairment caused in his present employment. Nor is there a set of noise control standards which would make it possible to ascertain whether the volume and other characteristics of a noise are above a level harmful to the ear.

The threat to the producer or manufacturer lies in the fact that payment of many claims like these would cause workmen's compensation insurance rates to skyrocket, possibly to a point where carriers would refuse to write policies covering loss or impairment of hearing. The employers would then be unprotected against such payments and could be forced into bankruptcy.

Probably the best protection against this very real danger is to take every possible step to guard against excessive noise in an industrial operation. This can be done in many ways in the concrete manufacturing industry. Noise and vibration can be reduced in many machines by mounting them on rubber; or they can be enclosed. Noise in aggregate chutes or bins can be reduced by means of rubber liners. In some cases also, acoustical materials can be used to soak up the sound instead of reflecting it. Employees working in especially noisy places can be provided with ear plugs. An employer who has taken every reasonable step to guard his employees against impairment of hearing will find this to be the best possible insurance against what has already become a racket.

Walter E. Trauffer

Another BESSER Booster ★

★ This is the 110th ad a series of ads featuring leaders in the Concrete Products Industry who are stepping up block production with Besser Vibrapac machines.

Glenn Ruegsegger, President and General Manager of Euclid Block Company, and his father, Fred Ruegsegger, Secretary and Treasurer.

Both Father and Son Prefer Vibrapacs at this Progressive Bay City Plant

Euclid Block Company, Bay City, Michigan, has been an enthusiastic user of Besser equipment since 1947. At that time, the company installed its first Vibrapac machine, a rear pallet feed model. Increased sales necessitated the installation, recently, of a second block machine, this time a modern Front Pallet Feed Vibrapac. Today, the Euclid Company produces more than a million block (8" or equivalent) per year.

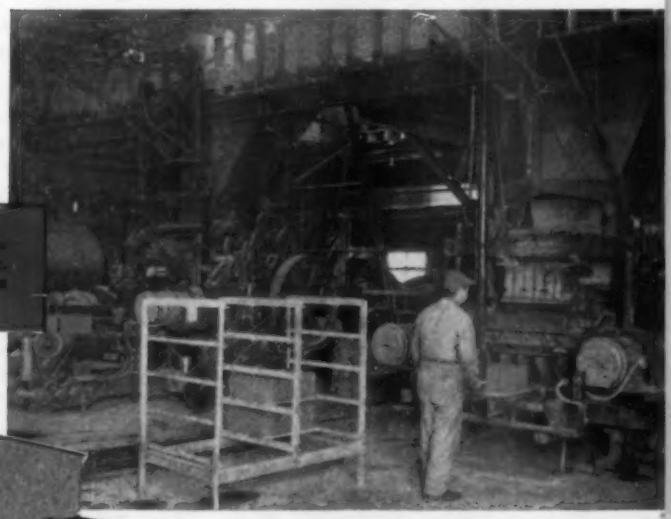
Speaking of the Besser Vibrapac, Glenn Ruegsegger, President and General Manager, states: **"It is the best block machine for high production and profit making"**. That's why, when a Vibrapac user requires additional equipment, he invariably orders more Vibrapacs.

BESSER MANUFACTURING CO. • Box 131 • Alpena, Mich., U.S.A.

Complete Equipment for Concrete Products Plants

A small home built with BES-STONE — the Split Block with Character. The Euclid plant is also equipped with a BES-STONE Block Splitter.

Interior view of Euclid Block Company plant showing two Besser Vibrapac machines in operation. Each machine is fully automatic, block taken is removed by pushing a switch button and guiding a power off-bearing belt.



Yard scene at the Euclid plant. High quality block — both cinder and sand and gravel units, as well as cinder brick and BES-STONE Split Block are distributed through dealers within a 50 mile radius of Bay City.

BESSER
50th Anniversary
1904-1954

A 7946-1PBC

A Half Century of Concrete Masonry Progress!

NEWS OF THE CONCRETE INDUSTRIES

N.C.M.A. Wins Top Honors For New Publications In Literature Competition

The National Concrete Masonry Association was recently awarded a certificate of exceptional merit by the American Institute of Architects and the Producers Council, which each year awards certificates of merit to manufacturers of building materials for excellence in product literature directed to the architect. N.C.M.A. received the award for its new publication *Ideas for Wall Patterns with Concrete Masonry*, and also an honorable mention for *Design and Construction of Lintels for Concrete Masonry Buildings*, released late in 1953. N.C.M.A. is urging all concrete products men to distribute both books to architects and engineers.

The Louisville Cement Company, Louisville, Ky., was also awarded honors in the same competition, receiving a certificate of merit for its new publication *Type of Workmanship Recommended for Concrete Block Walls*, an instructive booklet for bricklayers and blocklayers.

Western Producer's Block Takes to the Air for Speed

At Ephrata, Wash., Harold Conklin, owner of a local concrete block plant, recently sold his first blocks for delivery by air. A contractor in nearby Othello (about 45 miles away) needed a load of block in a hurry; so he called the block firm to meet his plane at the Ephrata air base with a truckload of block.

After loading, the contractor made a successful return flight, and the job was completed on time. Looks as if commercial air freight lines may have some potential business with concrete masonry makers.

Coming Events

August 9-11, 1954—Atlantic City. Annual conference of lightweight block manufacturers, sponsored by the National Cinder Concrete Products Association. Claridge Hotel.

August 24-25, 1954—Murray Bay, Quebec. Directors' meeting, National Ready Mixed Concrete Association. Manoir Richelieu.

October 18-22, 1954 — Chicago. 42nd National Safety Congress and Exposition. Conrad Hilton Hotel.

October 28-29, 1954—Los Angeles. Regional meeting, American Concrete Institute. Statler Hotel.

American Concrete Inst. Plans Regional Meeting In Los Angeles, Oct. 28-29

Plans are under way for the regional meeting of the American Concrete Institute to be held at the Statler Hotel in Los Angeles on October 28 and 29. Topics to be discussed in papers include the following: field methods in testing consistency by ball penetration, strength by impact hammer, determination of cement content of concrete before hardening, strength of concrete as affected by rattler test variations in aggregates, and some of the fundamentals of alkali-aggregate reaction.

Other papers will be presented on selected development subjects, such as requirements of steel for prestressing, strength of continuous prestressed beams, plans for manufacture of precast products, and features of free-way design and construction.

It is planned to schedule a group of papers dealing with the effects of earthquakes on concrete structures, a method of analysis of reinforced concrete structures and of the effects produced in general by earthquake forces, and other related material.

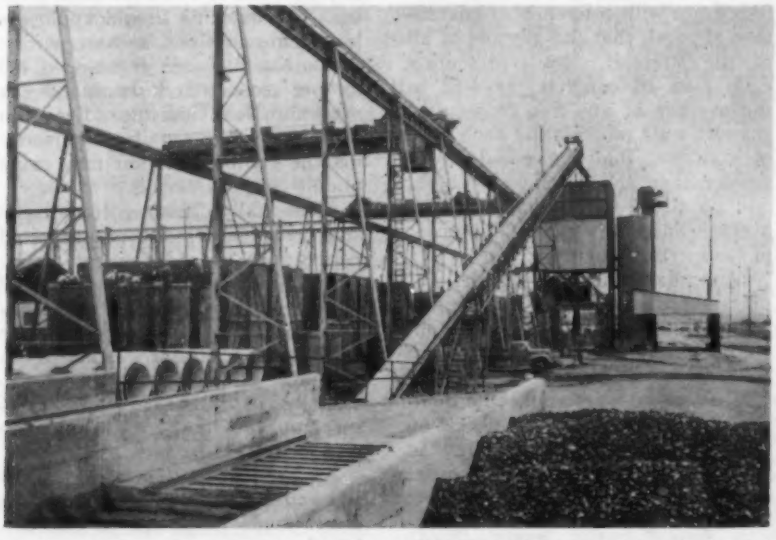
During the final session there will be a forum in which a series of short subjects will be illustrated and discussed, describing several recent projects with design and construction features of special interest. Some specific developments in concrete techniques will also be presented at this session.

Lightweight Block Makers To Meet in Atlantic City

Sessions of the annual conference of lightweight block manufacturers will be held at the Claridge Hotel in Atlantic City, N. J., August 9 to 11 under the sponsorship of the National Cinder Concrete Products Assn.

Special features will be an architect's view of the industry and an advertising man's angle on sales. Announcement of the conference was released by H. H. Longenecker, secretary-treasurer of the association.

The formation of a Kansas City Unit Masonry Group was undertaken recently by 43 representatives of the various segments of the concrete masonry industry. This organization follows the pattern of a similar group formed in Seattle, Wash., by masons, contractors, manufacturers, and distributors.



● The Basalt Rock Company, Napa, Calif., during the last year erected and placed in operation at Fontana, Calif., the concrete pipe plant pictured here. Large-diameter, steam-cured pipe only is produced, practically all output up to this point having gone into the second barrel of the San Diego Aqueduct. Purchased aggregates are discharged from trucks into the hopper (foreground) and then transferred to the bins above the concrete-mixing plant by belt conveyor. High-tensile strength in the Raybestos-Manhattan belting was assured by the duPont "Cordura" (synthetic) fabric in the plies.

Rx Ready Mix

By Harry F. Thomson

Correct Test Procedure Is Important—Part I

NO topic will induce a more spontaneous discussion among a group of ready-mix producers than reference to their experiences with tests of their concrete. Almost every producer can cite at least one instance in which he is confident he has been damaged (at least mentally if not financially) by test reports which he considers have not reflected truly the quality of the concrete tested. Every ready-mix producer should be familiar with correct test procedures.

The methods for the respective tests are given in the standards of the American Society for Testing Materials. Among the standards of special interest in connection with ready-mix are the following:

C-31 Making and Curing Concrete Compression Specimens
C-39 Test for Compressive Strength of Molded Concrete Cylinders
C-94 Specifications for Ready-Mixed Concrete
C-138 Test for Weight per Cubic Foot, Yield, and Air Content
C-143 Test for Slump of Portland Cement Concrete
C-172 Method of Sampling Fresh Concrete

There are additional methods for determining flexural strength, air content of fresh concrete (both volumetric and pressure methods), and various allied features such as organic impurities, surface moisture, soundness of aggregates, sieve analysis, bleeding, and others. But the first two of the standards listed above, namely the making and curing of specimens and the test for compressive strength, are of greatest interest to a ready-mix man.

One feature which should be understood clearly is the fact that some variation is to be expected in the strength of several cylinders made from even a composite sample of fresh concrete; this is due to the many factors which affect the strength shown by test. It is sometimes difficult to impress this feature on others who may not be familiar with concrete. For instance, the superintendent of an electrical operation may insist that concrete is faulty when successive cylinder strengths do not show the precision of uniformity with which he is familiar in electrical tests.

For this reason a strength "test" requires three standard test specimens (cylinders), and the test results is the average of the strengths of the three specimens. It is unfortunate that many specification writers provide that four specimens be cast, one to be broken at 7 days and three at 28 days, or two at 7 and two at 28 days. In the first case the single break at 7 days has no standing, and in the second case neither the 7- nor the 28-day breaks constitutes a standard test. In recognition of the fact that some variation in the strengths of three specimens of a test is to be expected, the standard specification for ready-mix (C-94) states with reference to guaranteed strength that the average of all of the strength tests representing each class of concrete, as well as the average of any five consecutive strength tests representing each class of concrete, shall be equal to or greater than the specified strength, and no strength test shall have an average value less than 80 percent of the specified strength.

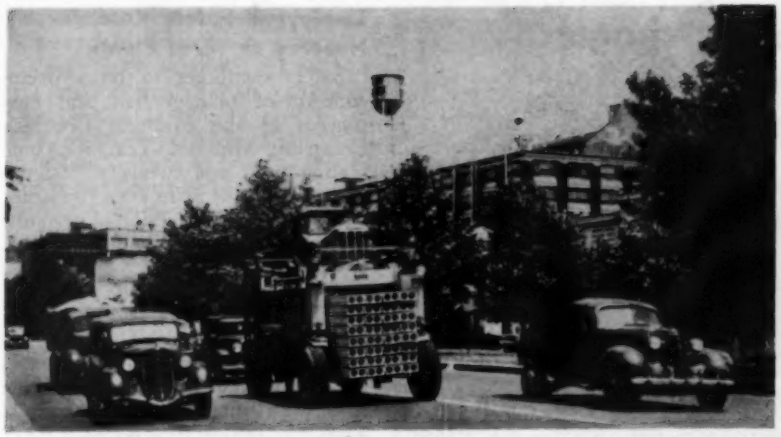
Misunderstanding as to the significance of strength tests sometimes results from confusion as to the objective for making the tests. Strength tests are made for one of two reasons, namely to determine the quality of the concrete or to check on the strength which the concrete in the structure has developed, in order to judge the safe time for removing the centering or for loading the structure. If the quality of the concrete is to be measured, the cylinders must receive the standard treatment specified in C-39, which is, briefly, to be protected from undue drying and kept at a temperature between 60 deg. and 80 deg. for the first 24 hours, then to be transferred to standard laboratory conditions of approximately 70 deg. and moist curing until capping for the test.

If the development of the strength of concrete in the structure is to be checked, the specimen is to be stored on the job under as nearly as possible the same conditions as the concrete in the structure. The compressive strength under the two conditions may differ considerably. It should be clearly understood that the strength of job-cured cylinders—*i.e.* stored on the job longer than 24 hours—is no criterion of the quality of the concrete delivered. In most cases the strength of job-cured cylinders will be considerably lower than the strength of cylinders cured under standard laboratory conditions. Also, with reasonably good conditions of placing and curing, the concrete in the structure is usually stronger at 28 days than job-cured cylinders.

The procedure for conducting the compression test in the laboratory is very important, although it is seldom witnessed by the ready-mixed producer. The simple matter of capping can and should be checked. Many laboratories still cap with plaster-of-paris, although its use as a capping material was outlawed many years ago. Capping of cylinders on window glass is poor practice because the surface is not a true plane. The testing machine should have a spherical bearing block which can be rotated and tilted easily in any direction to avoid eccentric loading. The machine should apply the load continuously at a constant rate of increase between 600 and 1,400 lb. per second, and should have a maximum load indicator. Errors in these and other details of performing the compression test may cause unduly low test breaks.

Incidentally, many commercial and agency laboratories are inspected periodically by the Cement Reference Laboratory, which is conducted by the National Bureau of Standards with the co-operation of the American Society for Testing Materials and the Portland Cement Association. A three-year tour of inspection covering 261 laboratories was completed recently.

An excellent outline of test methods and a discussion of some of the errors made frequently in conducting the tests are given in a pamphlet entitled *Specifications and Test Methods for Ready-Mixed Concrete* (Publication No. 47) issued recently by the National Ready Mixed Concrete Association.



• A "still" from the Clark Equipment Company's film "Over-the-Load Materials Handling" shows how over-the-road deliveries of concrete products are made, direct to the job site. The movie, which features applications of the straddle carrier type of industrial truck in many industries, is available from the company.

Texas Concrete Masonry Assn. Elects E. E. Knott President

E. E. Knott

Everett E. Knott, general manager of the Texcrete Company of Dallas, has been named president of the Texas Concrete Masonry Association, an organization of the state's block manufacturers. Mr. Knott succeeds William Smith of the Black-Brollier Company at Houston. Mr. Smith, in turn, was advanced to chairman of T.C.M.A.'s board of directors, succeeding Vernon Cole of the Texas Concrete Works at Waco.

John Barton of the Texas Concrete Block Company, Lubbock, succeeded Mr. Knott as T.C.M.A.'s secretary-treasurer.

Prestressing Firm Organized By Two Kansas City Concerns

Formation of a new firm, Mid-West Prestressing, Inc., at Kansas City, Mo., has been announced by the two concerns backing it, the Kansas City Bridge Company and the Long Construction Company. Lyle Cushing, who was for 25 years associated with the Kansas City Bridge Company, was named president.

Mid-West Prestressing will operate as a subcontractor on jobs requiring prestressing of concrete beams, girders, and panels. License rights to the use of the pressure method, according to Mr. Cushing, were acquired recently. James J. Mennis, president and general manager of Prestressing, Inc., San Antonio, Tex., and officers of the new Kansas City company signed contracts for rights to the process in Missouri, Kansas, Iowa, and Illinois. Subsidiaries may be organized in Arkansas, Louisiana, Mississippi, Alabama, Georgia, Florida, Nebraska, Wyoming, Colorado, Utah, Idaho, Montana, North and South Dakota, and Minnesota.

A.S.T.M. Establishes Award Honoring Frank E. Richart

The directors of the American Society for Testing Materials have announced the establishment of the Frank E. Richart Award, which has been made possible by his family.

An honorary member of the society, a long-time worker and officer, and chairman of Committee C-9 on Concrete and Concrete Aggregates in which he was an outstanding authority, Professor Richart was senior vice-president of A.S.T.M. when he became ill. He died in July, 1951.

Considering the nature of his work, the award is given for outstanding technical investigations in the field covered by Committee C-9. The award is to be given not oftener than every three years, and the amount will be decided by the directors of A.S.T.M.

About Our Cover Picture

• Our cover illustration shows how cubed Vibracrete block are handled by a Towmotor lift truck without pallets at the plant of the Concrete Building Units Company, Kansas City, Mo. By means of the special six-tined fork which slips through the openings of the bottom units (two to each block), perfect support is said to be achieved for the cube-load, which weighs approximately 3,100 lb. A cube of 12-in. units contains 54 block; one of 8-in. units, 72. One Towmotor operator can load a truck of 216 12-in. block or 312 8-in. block in 4 minutes. It used to take four or five men about 20 minutes to load a truck.

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AD-AIRE

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AIR ENTRAINING AGENT

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THE AD-AIRE FORMULA blends air bubbles evenly through the mix. It's an approved method of boosting quality while cutting costs. Only about 1 oz. per sack of cement is needed.

READY-MIX PLANTS report lower material costs and greater ease in handling. AD-AIRE increases flowability for faster unloading. Because of increased workability and plasticity, customers can handle the concrete faster...there is less bleeding, less segregation and fewer requests for added water. Mixers are easier to clean. It's a concrete that stands up to freezing and thawing and better resists scaling, spalling and cracking.

CONCRETE PRODUCTS PLANTS have found AD-AIRE air entrainment gives sharper corners and cleaner edges. There is less mixing time, smoother machine operation and faster production. The improved textures and finer finishes obtained with AD-AIRE provide products with a higher quality appearance. Machine-made products are uniform despite variations in moisture content and aggregate gradation. With AD-AIRE you'll also find a reduction in culls, stripping damage and green handling.

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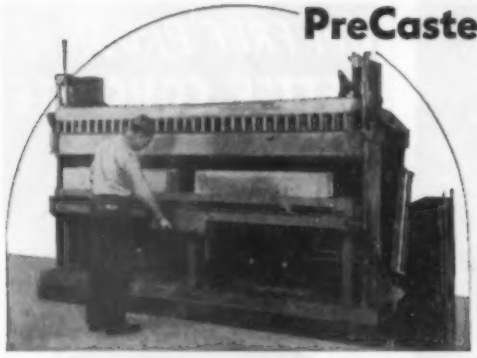

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- Be the first in your market to offer quantity production prices on concrete units that will strip through a straight box . . . slabs, lintels, highway guard rail posts, fence posts, joists, parking lot markers, channel roof, etc.
- Now you can book volume orders for any of these precast concrete units . . . hard to make by hand methods. Cut costs by Pre-Caster's fast production and build handsome profits . . . better than 100% markup.
- Write for data sheet and price list. You'll find that the relatively low investment will pay real dividends and be amortized fast!

- *Extra heavy* . . . stripper head frame of two heavy 2" x 3" cold rolled steel bars.
- Superb electrical vibration from two V-200 Syntron units.
- Handles any aggregate.
- One man operation.
- Makes units with 4" variations up to 10' long . . . lintels 4" x 8" or 8" x 8" up to 10' long.
- Overall: 7'6" high . . . 11'6" long . . . 4'0" deep . . . shipping weight 4620 pounds.

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Employees' Safety Records Honored at Three Plants

Safety continues to be a prime concern of management and employees of the Midland Concrete Company, Midland, Tex., for completing one- and two-year "safety" records. At this plant even the ladies work safely. Miss Billie Theriault, a secretary, received a one-year safety award.

At the Spokane (Wash.) plant of the Central Pre-Mix Company and the Union Sand and Gravel Company 24 drivers for the two operations received safe-driving awards from the National Safety Council at a banquet held in their honor. Trucks of the affiliated firms were driven safely more than 880,000 miles during 1953. Louis Nielsen and Pete Nelson both had driven trucks for 11 years without a chargeable accident.

The Dallas Concrete Company, Dallas, Tex., in conjunction with the Standard Accident Insurance Company, recently presented safety awards to 11 of the firm's ready-mix truck drivers, according to an announcement issued by P. W. Gifford, executive vice-president.

Universal Concrete Pipe Co. Opens Third Flexicore Plant

Universal Concrete Pipe Company was scheduled to begin production on May 1 in its third Flexicore precast concrete slab plant, according to T. H. Monaghan, vice-president. This is the first Universal plant to be established in West Virginia. It is located at New Martinsville, with sales offices in Wheeling and Clarksburg. Earl W. Chidester is managing the new operation, with Sam Buderman as sales engineer and Garth Poe as plant manager.

The new plant will produce slabs in 8- by 16-in. and 6 5/16- by 12-in. cross-sections, with lengths available in inch variations up to 30 ft. and 22 ft., respectively. Initial production capacity is 100,000 sq. ft. annually. Universal opened its first Flexicore plant in Tampa, Fla., in February, 1952. Last year a second plant began production at Miami.

R. E. Copeland, director of engineering of the National Concrete Masonry Association, was a speaker at the Texas Concrete Masonry Association's spring meeting in Austin, Tex. He also participated in the 39th annual meeting of Building Officials Conference of America held in Philadelphia on May 10.

New R.M.C., Products Plants Opened in Several Areas

New plant installations have been reported in the Middle West, West, and South.

Kost Brothers of Moorhead, N.D., announced plans to build a $35,000 ready-mix plant in Fargo, N.D., this spring. Officers are John Kost, president; J. S. Johanneson, vice-president; and Ronald Kost, secretary-treasurer.

At Jasper, Tex., Few & Mays Construction Company added a ready-mix operation to their business.

Both concrete products and transit-mixed concrete will be turned out by the Clyde J. Keys Industries, St. Petersburg, Fla., at the firm's new $75,000 plant addition.

Production began on May 1 at Elgin Ready Mix, Inc., Elgin, Ill., recently incorporated by C. J. Crays, J. V. Barthemio, and James Carlino.

A new industry in Sun Valley, Calif., is the Le Valley Ready-Mix Company, whose plant represents an investment in excess of $100,000. Owner and operator of the business is Chauncey T. LeValley, who was associated with the Consolidated Rock Products Company, Los Angeles, for 30 years.

At New London, Iowa, a concern will do business as the New London Transit Mix Company, headed by the following: Ralph Miller (co-owner), president and treasurer; Howard Miller (co-owner), vice-president and secretary; Maynard Miller; and Frank Goody.

Bowling Green, Ohio, is the site chosen by the Marietta Concrete Corporation, Marietta, Ohio, for a concrete silo stave plant.

Richwood Concrete Products will erect a plant at Belle Center, Ohio, for the production of concrete drain tile and block. It will be operated as a division of the Richwood firm.

Incorporation of the Tipton Ready Mix Company at Tipton, Iowa, by Herbert L. Morehead, Nelle A. Morehead, and Herbert L. Morehead Jr., Cedar Rapids, was announced recently. The firm also operates the Stanwood (Iowa) Ready Mix Company and the Morehead Construction Company in Cedar Rapids. A plant and equipment were purchased locally, and production has begun. Roy Lindsey is manager.

A. F. Spurgin, president of the Cement Specialty Company of Columbus, Ind., has announced the establishment of a plant for the manufacture of concrete incinerators (small and municipal size) near Seymour, Ind. Equipment will be moved from Columbus. This firm also operates a manufacturing plant in Indianapolis.

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Clark's HYDRATORK DRIVE Carloader

The revolutionary HYDRATORK DRIVE lift truck is now available in Clark's 3000-5000 lb. Carloader. The new clutchless, torque converter transmission has already won many friends among users of Clark's 6000-7000 lb. Utilitrucs. The basic benefits of this Clark-built transmission are:

1. **Lower cost:** no gear clash, no clutch problems, excellent serviceability.
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● An aerial view of the Page Avenue plant of Majestic Building Materials Corp., St. Louis, Mo. At the far left are the two ready-mix batching plants and the block plant. The structure at the right houses the garage, the repair shops, and the warehouse.

another ON THE SPOT report

Strategically Located Plants Of St. Louis Ready Mix Firm Serve Extensive Market Area

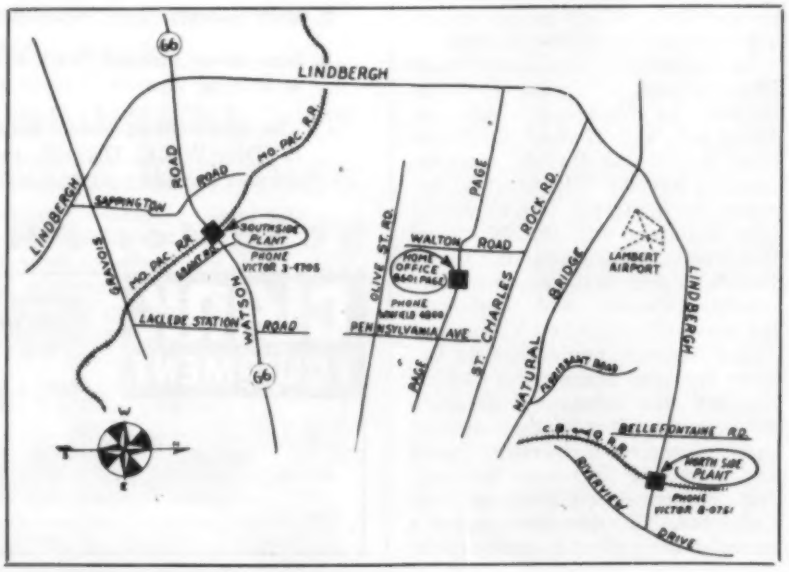
ONE of the Midwest's outstanding multiple ready-mixed-concrete plant operations is conducted by the Majestic Building Materials Corporation at St. Louis, Mo. Although the company's original venture in the ready-mix field dates back only to 1946, today it operates three large plants which are so situated that not only the city, but the entire county of St. Louis can be conveniently and expeditiously served. All three plants are located on or near the main bypass highway which carries traffic around the western side of the city, and in consequence the company has been in an excellent position to supply many of the numerous industrial building projects launched in this area since the war.

So far as ready-mixed-concrete is concerned, the St. Louis area is probably as competitive as any locality in the country today. This is borne out to some extent by the fact that there are 17 companies operating a total of 21 plants. Out of this group only Majestic falls in the three-plant classification. Two concerns operate two plants each, while the remainder are single-plant establishments.

Two of Majestic's plants are twin setups which have a capacity of 1,000 cu. yd. each per day. These are the Page Avenue and the Northside plants, which are, respectively, the oldest and the newest setups. The Southside plant, which went into operation in 1950, has only a single batching setup, with a theoretical capacity (*i.e.* not yet attained) of around 900 cu. yd. per day. All are equipped for central mixing.

The company's 3-acre property on Page Avenue is the mainspring of the whole enterprise. There, in addition to the ready-mix plant, are the main offices, a well-equipped high-production block plant, the garage and repair shops for a fleet of approximately 50 trucks, and warehouse space and other facilities for the firm's extensive general building supply operations.

The major ready-mix facilities at



● Right: The locations of Majestic's three operations—Southside, Page Avenue, and Northside—are shown on this map.

this location consist of an 8-compartment Johnson Octo Bin, which is operated in conjunction with a 2-cu. yd. Ransome central mixer, and an auxiliary 4-compartment Johnson plant used for special jobs, for dry batching paving orders, and to supplement the main plant whenever necessary. Storage space for bulk cement at this location totals about 2,000 bbl., distributed among four tanks — one for each of the ready-mix batching plants, one for the company's modern high-production block plant situated on the same property, and a general storage unit from which any of these three may be supplied.

Aggregates are received at the Page Avenue plant by rail and truck, both types of equipment discharging from parallel ramps into a compartment concrete bins which hold about 1,400 tons of material. In practice the rail siding is used for gravel and the truck ramp for sand. Supply bins are filled from this storage system by means of inclined belt conveyors. Trucks may also be loaded by gravity to take care of retail sand and gravel purchasers.

There is a separate aggregate-handling system for the block plant, and the bins are high enough so that the materials move by gravity clear to the block machines. Approximately 10,000 8-in. equivalents are produced daily with two Super Vibrapac block machines, and there are 17 conventional steam-curing kilns of sufficient capacity to handle this entire output. There are two separate boiler installations to serve the block plant and the ready-mix plants, and these are so arranged that on an emergency basis either can supply the points served by the other.

At the Southside plant primary facilities consist of a 4-compartment Johnson bin and a 5-cu. yd. Smith tilting mixer. Aggregates are discharged from railroad cars or trucks into a pit and are conveyed to the plant or placed in a live storage system consisting of two 300-ton tanks located over a reclaiming belt.

Considerable quantities of aggregate are also placed in open stockpiles and reclaimed with a clamshell crane.

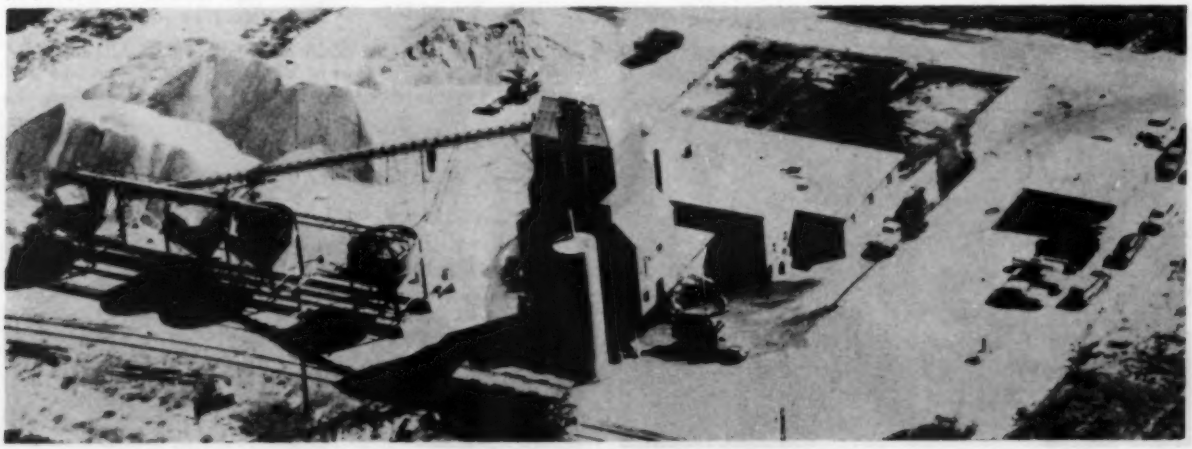
The Southside plant is served by a single 1,200-bbl. Johnson bulk cement tank, and there is a 4-cu. yd. batcher. This 4-year-old setup has a nominal capacity of 900 cu. yd. per day.

Majestic regards its Northside plant as the best and in many ways the most efficient. This is also a twin installation consisting of two complete 4-compartment Johnson batching plants mounted back to back. Both settings have sufficient headroom to accommodate 5-cu. yd. mixers, but at present only one side is equipped for central mixing, and the machine is a 2-cu. yd. unit.

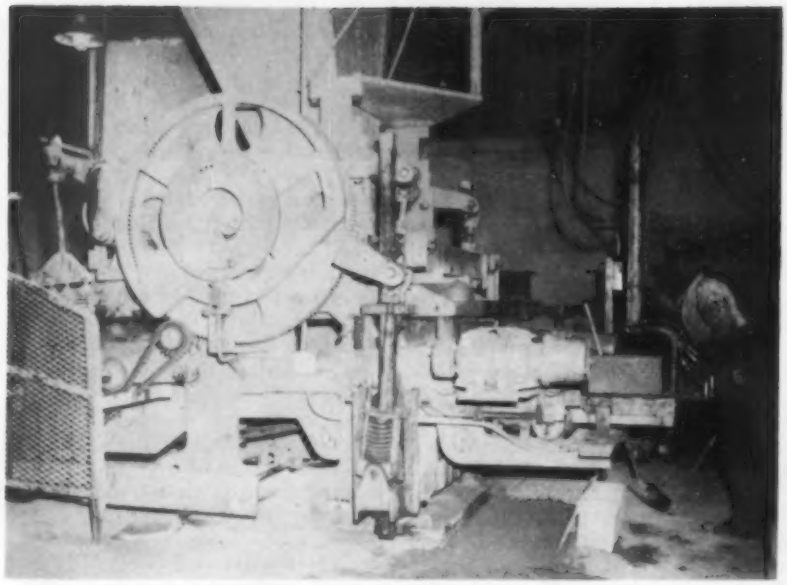
For live storage of aggregates the Northside plant has four 250-ton circular bins mounted over a reclaiming belt. Materials are received by rail or truck and placed in the bins by utilizing the reclaiming system in combination with a tripper belt, located over the bins. Bulk cement storage is provided by a 1,200-bbl. tank, which is filled from the rail siding by means of a screw conveyor and a bucket elevator. The bin storage system at the Northside plant is supplemented by an extensive paved area used for open stockpiling.

All three of the Majestic plants are so set up and so located that material costs vary only a few cents whether the method of shipping is by truck or rail. Each plant is self-sufficient to the extent that it has its own dispatcher, but the entire network is actually very closely coordinated and interlocked. Although advance orders may be placed at any one of the plants, most orders are actually filled from the plant closest to the delivery point. The three plants are so strategically located that

● The Southside plant has only a single setup for batching, and is somewhat restricted for space.



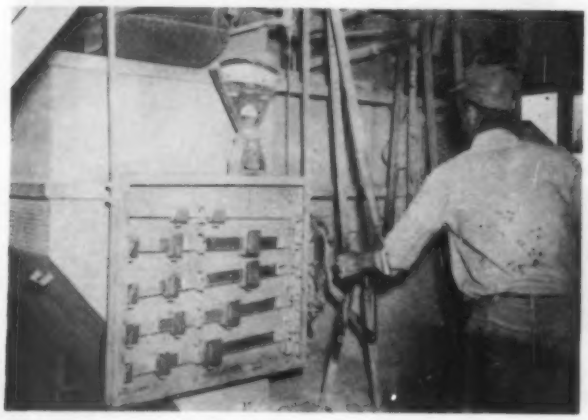
● The Northside plant (below) is the newest installation, and is in a number of respects the most efficient of the three properties.



● One of the two high-production block machines at the Page Avenue plant.

● A portion of the system of belt conveyors for reclaiming aggregates at the Southside plant.

● A view of one of the batchers at the Northside plant.



it is possible in most cases to maintain a 5- or 6-mile maximum limit on length of haul.

Dispatchers at the various locations are in almost constant touch with one another by telephone throughout the working day. Thus, if one plant starts to clean up scheduled orders early in the day, its facilities are immediately made available to the other plants, in order to expedite deliveries. Although this practice does inevitably lengthen certain hauls, the company firmly believes that the additional cost is well repaid by improved customer relations. All concrete is sold on a delivered basis.

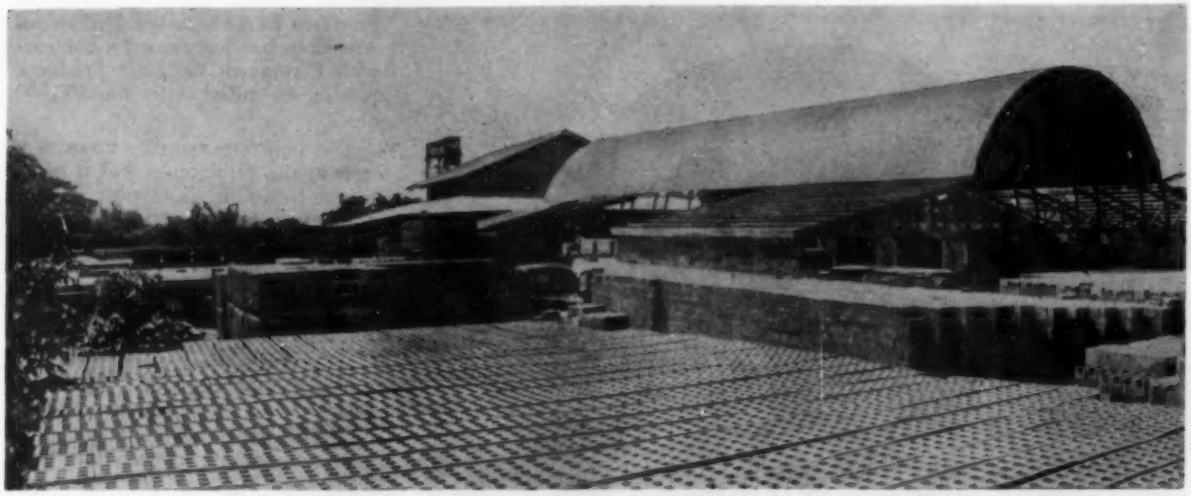
Majestic operates a total of around 40 truck mixers—mostly 6-cu. yd. Challenge units mounted on International, Ford, and Mack chassis. This fleet is shuttled at need from one plant to another, although at any given time more of the units are likely to be working out of the centrally-located Page Avenue plant than from either of the other two establishments. It is not at all unusual, however, for a particular truck to load out of all three plants during the course of a single day.

Although both the Southside and Northside plants have garage space for truck mixers, the main truck storage building is located at Page Avenue. This extensive reinforced concrete structure houses remarkably complete shops for general maintenance work on rolling equipment. Four mechanics are employed in the shops on a year-round basis, and their activities range from making minor repairs to carrying out complete overhauls.

In line with the firm belief at Majestic that a ready-mix company is judged to a considerable degree by the appearance of its trucks, the company goes to considerable pains to see that every unit of its own fleet meets the most critical standards. A

(*Continued on page* 284.)

● One of some 40 truck mixers which make up Majestic's delivery fleet. All units carry the same distinctive color scheme, and are kept immaculately clean and in top-notch repair.



● A portion of the stockpile of Permanent Concrete Products, Inc., containing approximately 300,000 units. These are cured in the open air for a period of 15 days to acquire the necessary strength.

Block Maker in Philippines Operating Successful Plant

By OSIAS R. PENALOZA

DURING World War II, many countries in the Far East suffered a heavy toll of life and property, and the industries in the Philippines were hard hit. Perhaps the heavy destruction was chiefly responsible for the swift progress evident in recent years in the field of construction, engineering, and architecture—and, inevitably, in the concrete block business.

Don Ramon Roces, publisher-industrialist of Manila, saw the opportunities at hand. Envisioning the potentialities of concrete block making and the significant role it would play in the rehabilitation program of his country, he built a block plant in 1947. His firm, called Permanent Concrete Products, Inc., undertook the task of turning out sturdy and economical concrete masonry units to replace weak adobe stones, expensive reinforced concrete, and other materials used before the war in the construction field.

The facilities of Permanent Concrete Products are in Cordeleria, Sta. Mesa, Manila. The plant site is near the Pasig river, a tract having an area of 23,753 square meters. There are two edifices, one housing the main office and the other the main plant. Three block machines are in service, two Stearns No. 7 Joltcretes and one electronically-equipped Besser Super-Vibrapac. The latter is the latest importation of the firm. This machine alone is capable of producing 12,000 units every 8-hr. shift, or enough to build three medium-sized bungalows.

More than 100 men are working under the direction of Osias R. Penaloza, general manager. Normally, at least 300,000 blocks, equivalent to a month's reserve, are stockpiled. These are cured for a period of 15 days with water and solar heat. As yet, no company in the Philippines uses a kiln for curing blocks. Six trucks and one trailer handle daily deliveries to customers, but at times more outside commercial trucks are hired to cope with the increasing demand.

At first the problem was how to make construction people "block conscious". It was necessary to persuade them to abandon materials formerly used in favor of concrete block. Up to this moment, merchandising concrete block on a national scale is a problem still unsolved Concrete products, because of their weight, are too costly to transport, by land or sea, to provinces at considerable distances from Manila. Eventually other plants must be erected in outlying districts.

The present economic status of the Philippines calls for more buildings and houses to satisfy the needs of a growing population. Many families are homeless; business enterprises need buildings; the government must reconstruct its roads, bridges, and parks; highways, communities, and business centers must be improved. This means that building materials like cement, gravel, sand, and concrete block are needed.

Building has also been stimulated by money from abroad. Much of the foreign capital entering the Philippines is directed to real estate

● Some of the executives and employees of Permanent Concrete Products, Inc.

● Another view of the company's stockpile fronting a big Quonset hut. Green block in racks are taken there from the plant.

investments. According to a survey cited in the *Manila Bulletin,* American investments in the Philippines in 1950 amounted to $₱49,000,000, against $75,000,000 in 1945.

In the work for more progressive, more peaceful, and happier community living, the government of the Republic also does its part. In conjunction with some private financial enterprises, the government has undertaken housing projects for families in the lower- and middle-income groups.

Permanent Concrete Products supplied to the People's Homesite & Housing Corporation a total of 1,759,000 blocks for three projects. The Bago-Bantay Housing Project, constructed with government funds, required 250,000 block. Construction of the U. S. Veterans' Hospital, financed by the Federal Government of the United States, will start very soon with an initial order of 350,000 units.

The latest home community development is a 600-unit project to be constructed under the auspices of the Philippine-American Life Insurance Company. It will be available to families of moderate means on an installment-purchase plan. The site, ideally located in Quezon City, about five miles south of Manila, will be a complete neighborhood in itself, with a church, a university, playgrounds, amusement places, and markets. President Earl Carroll of Philippine-American has just signed a contract with Permanent Concrete Products, placing an initial order for 500,000 block.

The concrete masonry business is new in the Philippines, but it has a bright future if those now in that field continue to develop their market.

Evans Pipe Co. to Construct $400,000 Plant at Columbus

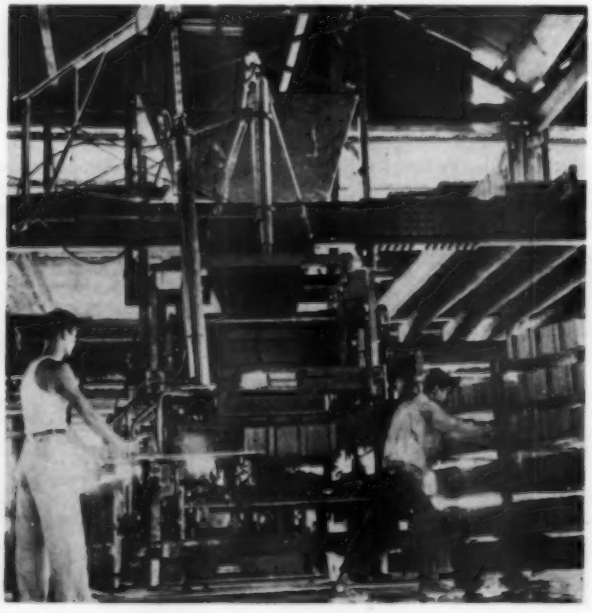
The Evans Pipe company which operates four plants in Uhrichsville, Ohio, is constructing a modern $400,000 plant in Columbus soon for the manufacture of concrete pipe and other concrete products. Production will begin as rapidly as the buildings can be completed and equipment installed.

The firm was founded 48 years ago by the grandfather of the present chief executive, Thomas J. Evans III, and management has been in the same family throughout the half-century.

Newest of N.C.M.A. promotional publications is a booklet entitled *Ideas for Wall Patterns with Concrete Masonry.* This copiously illustrated brochure pictures modern and attractive types of treatment for offices and theatres, residential exteriors and interiors, schools, and churches. It also contains factual information on sound absorption, wall patterns, and related subjects, and presents suggestions on finishing techniques.

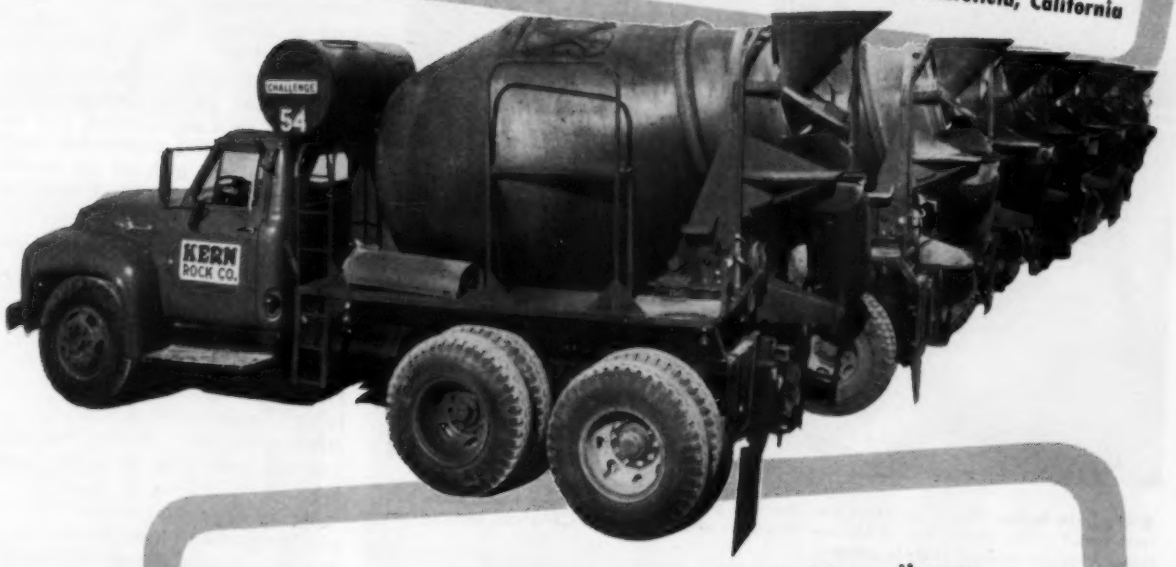
● Right: Front view of the second block machine, the latest addition to the company's steadily increasing assets.

● Below: One of the block machines in operation. The latest improvements in block manufacturing equipment are supplied. In the foreground is one of the steel racks (locally made) on which finished units are deposited as they come from the machine.



"We reduced our repair parts inventory from $14,000 to $700 and cut service and maintenance time 40%"

MR. ED CUMMINGS, KERN ROCK CO., Bakersfield, California



"Prior to purchasing Challenge Truck Mixers," says Mr. Ed Cummings, "we operated 20 mixers of another make. In order to be sure these mixers were always ready to go, it was necessary to maintain a $14,000 repair parts inventory. In 1949 we began our *change over* to Challenge Mixers. Each year we have added new mixers and today, we operate a fleet of 25 Challenge Mixers and have less than $700 tied up in inventory! Further, our service and maintenance records show that we now spend 40% LESS time on 25 Challenge Mixers than we did on 20 mixers of another make."

$13,300 is a "lot of dough" — in anybody's money! Especially when it is tied up unnecessarily in repair and replacement parts. A very important fact to consider when buying new equipment.

COOK BROS.
EQUIPMENT COMPANY
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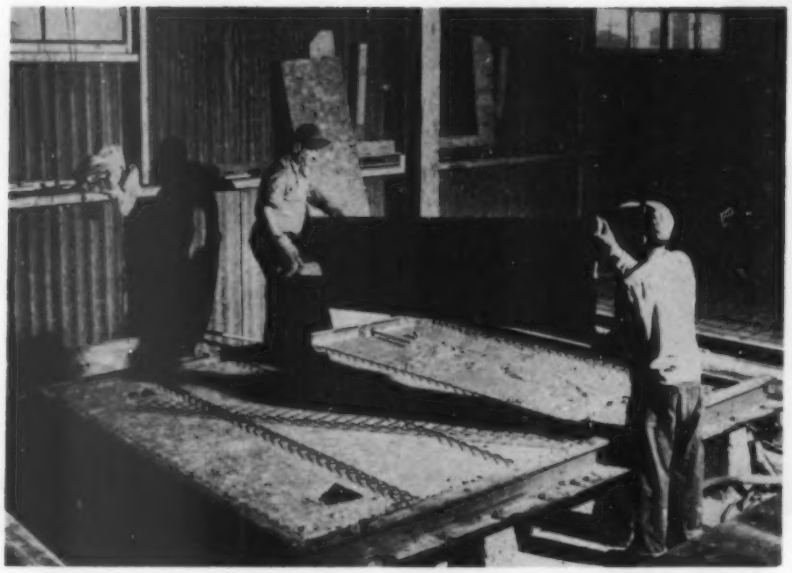
CHALLENGE MIXERS COST LESS! . . To Own . . To Operate . . To Maintain

Panel Construction Speeds Erection
At Aircraft Plant on Long Island



● Workmen laying 1½-in. insulation over the first pour of concrete for a panel which will form a part of the curtain wall of the new Grumman aircraft plant at Calverton, Long Island. Note the socket anchors near the corners.

A NOVEL and economical method of curtain wall construction was used for the first time in the East at the Grumman Aircraft Engineering Company's plant at Calverton, L. I.

The technique consists essentially of precasting slabs of concrete weighing nearly two tons each, transporting them by truck to the site, and bolting them into position on the steel frames of the seven buildings comprising the plant.

The massive slabs, most of them 8 by 10 ft. in size, have a textured surface and bear some resemblance to Indiana limestone. They create a clean, rather modern wall with a high degree of visual impact in scale with the extensive facade.

While the economics of the job cannot be accurately determined until the plant is completed, a rough idea of the savings can be estimated from the fact that nine men and a crane can install about 30 panels a day, which cover about 2,400 sq. ft.

To lay the 48,000 bricks that would be required to cover this area would call for about 80 bricklayers and 55 helpers, far more than a sparsely populated section such as Calverton can draw from its own inhabitants. Cost of the panels and brick is roughly the same.

In addition to cutting down the amount of field labor, this method eliminates a number of corollary costs such as wheelbarrows, scaffolding, and cleanup. It is flexible, as panels vary from very small in size to the 8- by 10-ft. size in which most are cast. The U value of the wall of 0.14 far surpasses that of 12-in. masonry at 0.36, although the panels are only 5 in. thick. A layer of Fiberglas insulation in the center of the panels accounts for the low heat transfer.

A number of others have been constructed in various parts of the country, since the first building employing this method was built about three years ago. The Grumman plant is the first to use it in the New York-New England area.

The panel-casting operation is being done by Precast Building Sections, Inc., of New Hyde Park, Long Island, about 50 miles from Calverton, in association with Marietta Concrete Corporation of Marietta, Ohio, which supplied metal forms and advisory services. This technique was developed originally by Marietta Concrete and Ford, Bacon and Davis, a New York engineering firm.

In the first phase of the casting process, the steel frames are oiled with a parting agent. A sheet of muslin, which gives a slightly textured appearance to the inside face is then laid on the bottom plate. Perimeter rails are fastened, and the first layer of steel reinforcing mesh is emplaced one inch off the bottom of the form. A layer of concrete from a 1½-cu. yd. bottom-dump bucket is delivered and thoroughly vibrated.

A team of workmen then lays sheets of 1½-in. Fiberglas insulation on the fresh concrete. Fiberglas was selected because of its low U factor and low cost and because, being of inorganic material, it is unaffected by moisture and corrosion, and will last for the life of the building.

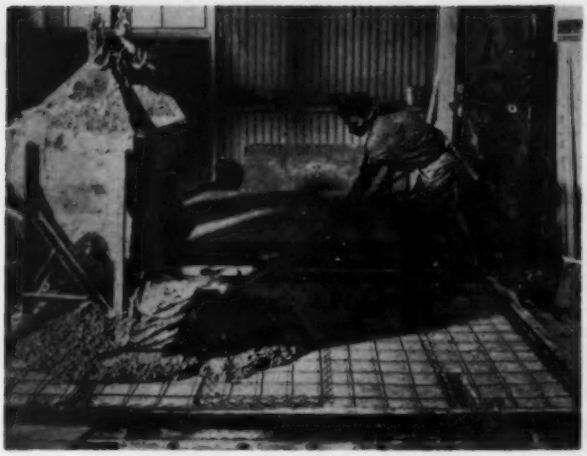
Remaining steps consist of emplacing a second layer of wire mesh, dumping a second pour of concrete, vibrating the mix, and smoothing the surface with a large wooden float. This outer surface is given an overall series of fine, parallel grooves by drawing a broom across it while still impressionable.

Panels remain in the forms for about 20 hours and are then taken by overhead crane to the nearby curing chamber in which 100 percent humidity and 120 degree temperature are maintained. They remain there 24 hours.

U-bars are cast into the top of each panel for handling by crane. Four socket anchors in each slab on the inside face are the means by which the panels are bolted to the framework of the building.

With three truck-tractors and six trailers commuting between New Hyde Park and Calverton it is possible to have a supply of panels on hand at all times without tying up tractors. Cranes on the job lift panels directly from trailers to their assigned places on the building.

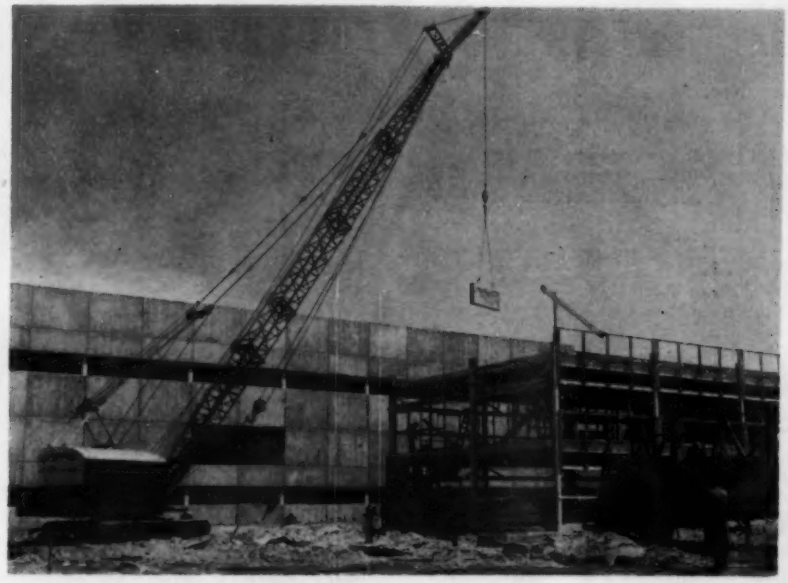
Emplacing of the panels on the steel frames of the buildings involves little more than lifting the panels into position and inserting bolts from the inside of the building.

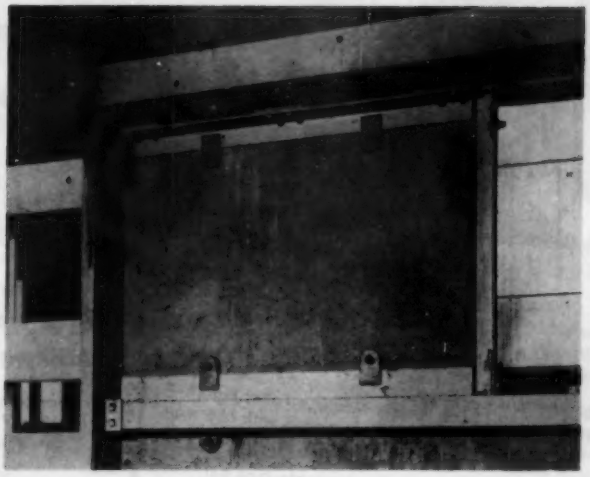


● The second concrete pour is delivered to the form by a tramrail system.

● Leveling the concrete surface with a steel screed. Curing will follow the next day.

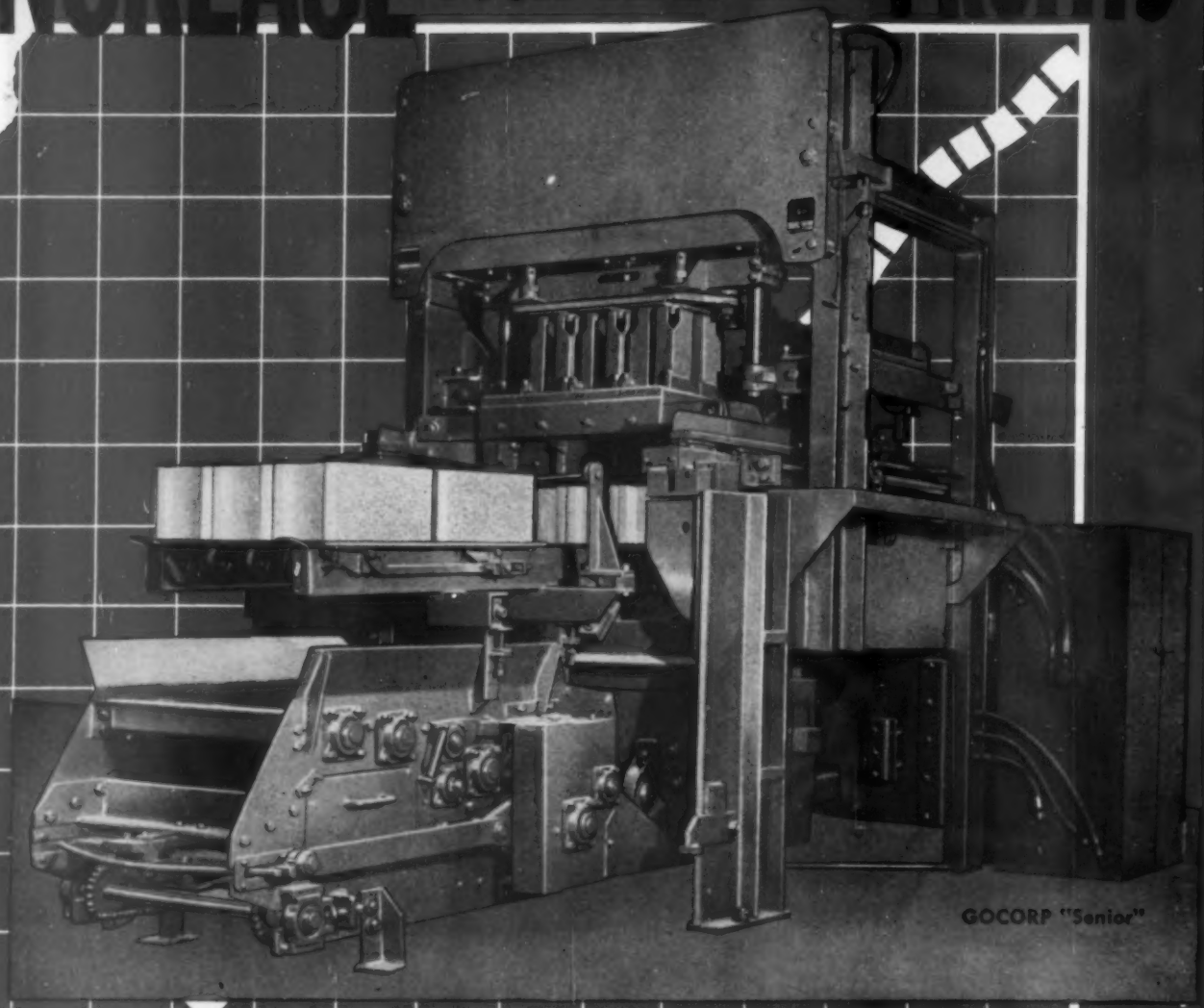
● Above: Securing the lift cable to U-bars on the slab is a simple one-man operation. The slabs are left on the site.
● Right: Panels are transferred from trailers directly to their places on the steel frame.





● Above: Interior of the wall. A workman secures the panel with a wrench, once it is in place.
● Left: A crane eases the panel into position, where it will be bolted into place. Nine men and a crane install 30 panels a day.

INCREASE *YOUR YEAR END* PROFITS



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Because GOCORP Plain Pallet Machines (The King —6 at a time or the Senior—3 at a time, illustrated) mean ✓ a quality product that helps you get customers and repeat orders ✓ quantity production for lower *unit* production costs ✓ reduced maintenance and uninterrupted production allowing you to keep the profits you've made.

AND with a GOCORP there's no fear of obsolescence.

For complete information on plain pallet machines, batch mixers (12 to 75 cubic foot capacity), pipe and tile machines, or junior cored pallet block machines write or phone today.

HERE'S HOW GOCORP DOES IT—

- **Direct Feed** from main supply hopper to mold (no old fashioned feed drawer) plus intense vertical vibration (pallet clamped to mold) assures a uniformly dense unit.
- **Sequence Operation** for easy adjustment and greater production. Under Machine Pallet Return—saves space and reduces labor costs with one man operation.
- **Hydraulic Drive**—Smooth trouble-free performance—reduces maintenance. GOCORP'S Johnny-on-the-spot factory trained men for help when you need it.
- **Advanced Design** gives you "Tomorrow's machine today."

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Left to right: the three Dagostino brothers, Kenneth, Lawrence, and Andrew, and their father, Frank Dagostino, founder of the company.

General view of the Dagostino plant at Schenectady, N.Y. At the far right are the aggregate storage bins into which trucks can dump directly.

Eastern Block Maker Mass Produces Batter Block for Manholes on Vibration Machine

FOR SOME months now a block concern at Schenectady, N.Y., has been going to town with a new type of core box which adapts a modern, high-production block machine to the making of batter units for manholes and catch basins. The device was developed by Stearns Manufacturing Company, and the first user is the firm of Dagostino Building Blocks.

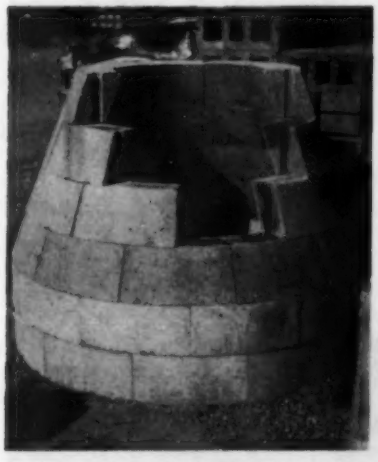
With the new-type mold box and a Stearns 15 block machine, the Schenectady firm is able to manufacture approximately 3,700 batter block in an 8-hr. day. Total production of batter block in this area formerly amounted to some 75 units per day in a small plant which used hand-casting methods.

Since Dagostino operates a three-at-a-time machine, the equipment designed and built for their use makes two batter units per cycle of operation, or three barrel-rim units. The method is entirely applicable, however, to two-at-a-time machines, although output in this case must be down-rated to one batter block or two barrel units per cycle.

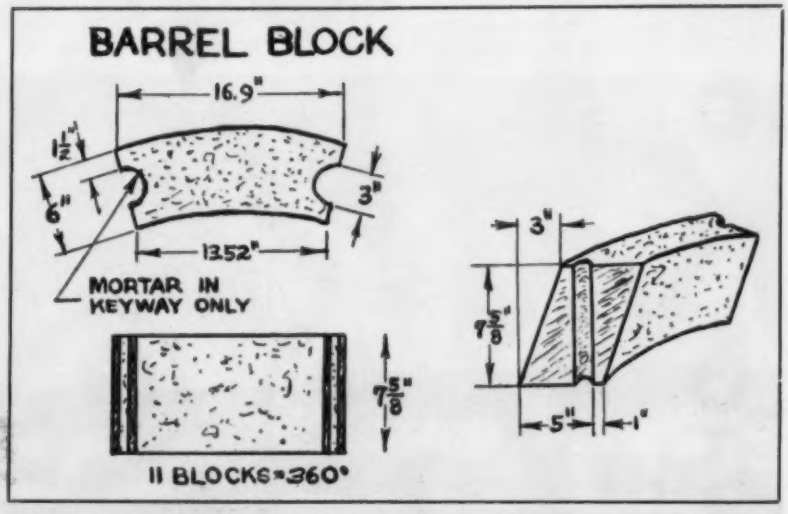
The Stearns device is believed to be the first entirely successful batter attachment adapted for use on a vibration machine. The basic problem of stripping without a separate operation has been solved by means of an arrangement of hinged inner plates and cams, the latter causing the plates to collapse as the mold box rises. The fairly complex shape can thus be molded at the same speed as ordinary solid units, and somewhat more rapidly than is the case with cored units. The rate at the Dagostino plant is about 11 units per minute.

The batter block and the barrel block produced at Schenectady are 7⅝ in. high by 6 in. thick, and the

(*Continued on page* 284.)



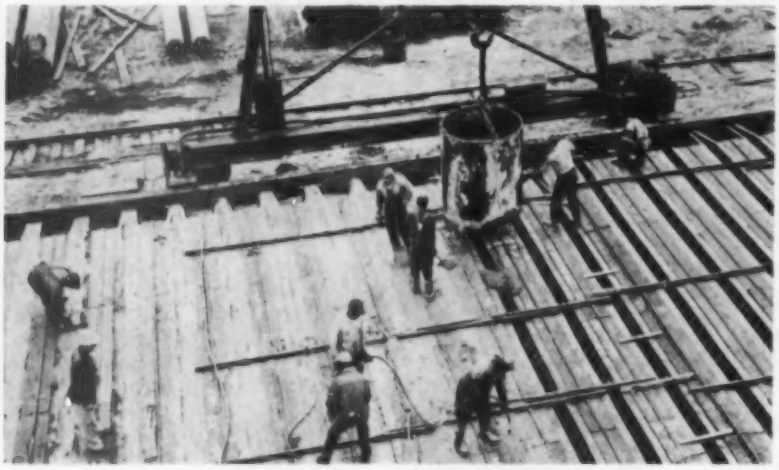
Dry lay-up of a manhole using the machine made batter block and barrel units.



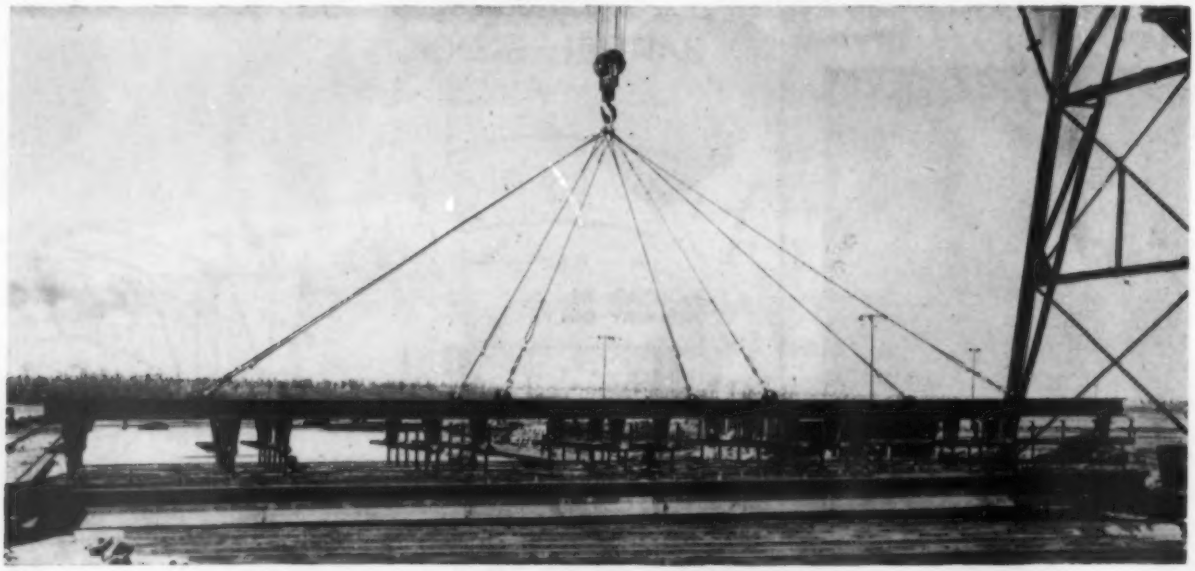
Detail of the two basic types of units used to form a manhole. (Barrel block, left; batter block, right.) Four sizes of batter block are required to make a 4-ft. manhole.

Site Casting of Concrete Piles For Ammunition Loading Terminal

● View of the 750-ft. long pile yard of the Diamond Construction Co. where steel forms for the production of concrete piles are set up and poured.



● A gantry crane is used to both set the forms (see below) and to pour the concrete (above). Fifty piles are poured each day, while another 50 forms are set up and prepared for pouring the following day.

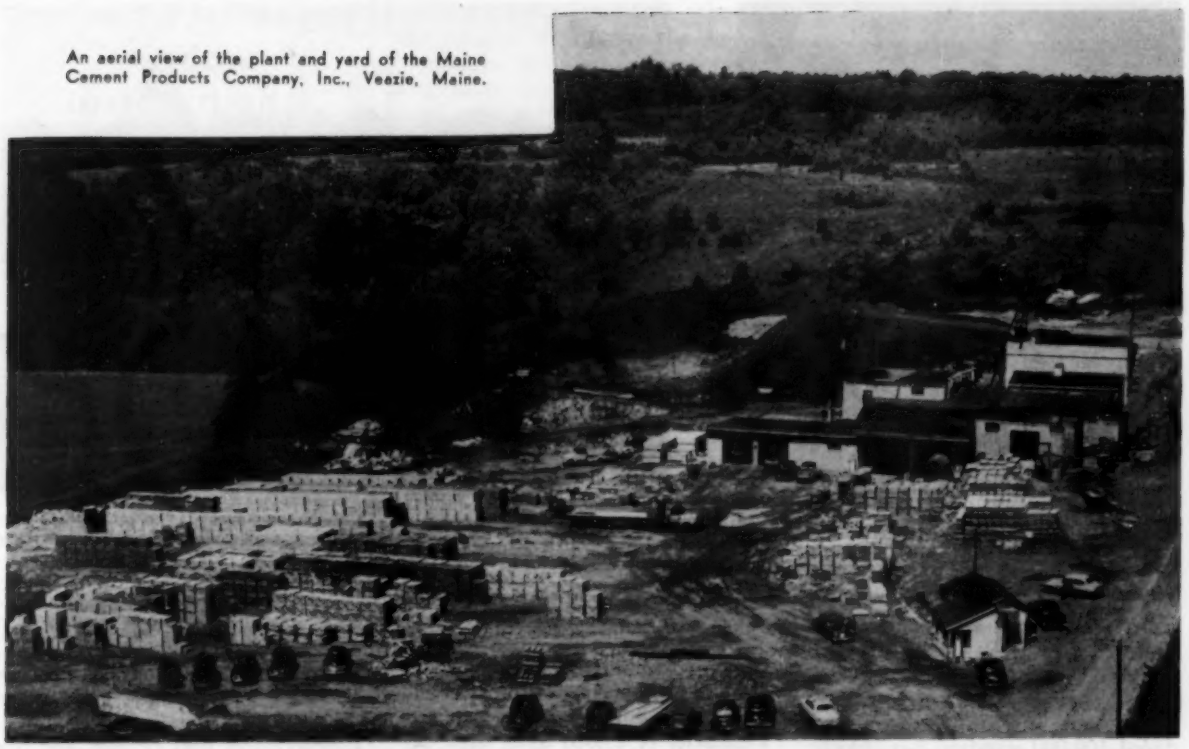


THE accompanying photographs show various operations in the site production of octagon-shaped reinforced concrete piles for the Wilmington, N. C., ammunition-loading terminal. The work is being carried on by the Diamond Construction Company of Washington, D. C.; and when completed, the project will have utilized a total of 9,575 piles ranging from 18 to 22 in. in diameter. The units vary in length from 24 to 62 ft., with 50 ft. representing an approximate average.

Diamond is making use of one hundred 14-gauge steel forms, this number including 40 forms for making 18-in. piles, 48 for 20-in., and 12 for 22-in. Fifty piles are poured each day, while the remaining 50 forms are set up and prepared for pouring on the following day. The forms are stripped 48 hours after pouring.

The company is working with five sets of 50 soffits each, or 250 soffits in all, and these are laid out in a pile yard which measures 750 ft. in length by 67 ft. in width. Soffits consist of a 1-in. plank deck supported on a foundation of 2- by 4-in. oak stakes driven into the ground to a depth of approximately 3 ft. The stakes have a total length of 42 in. and there are 60 of them supporting each soffit.

A sizable bridge crane (or gantry) is used in setting the forms and pouring the concrete, while the piles are removed from the soffits with a 25-ton P&H crane. Concrete is delivered to the site in standard ready-mix trucks which are discharged at the job into 6-cu. yd. buckets. The actual pouring is done from the buckets.



An aerial view of the plant and yard of the Maine Cement Products Company, Inc., Veazie, Maine.

Maine Products Manufacturer Continues to Expand to Meet Demand

Supplies most of blocks sold in state—

By WALTER E. TRAUFFER

THE Maine Cement Products Company, Inc., of Bangor, Maine, is the largest producer of concrete products in that state. Its climb to that position is an interesting story. It is essentially an account of Jess Storey, president, and it culminates in the company's modern new plant at Veazie, 3 miles north of Bangor.

Mr. Storey began his business life as an architect and concrete contractor. His first venture into concrete block production was in Panama City, Fla., in 1935, when he opened a small plant with hand-operated machines. In 1946 he started another venture in Louisville, Ky., with a larger operation.

This was not far enough north, however; so early in 1948 he moved the equipment from Louisville to Milford, Maine, 9 miles north of Bangor, and formed the present company. During all of this time Mr. Storey had followed his architectural and construction pursuits, with block as a sideline. In Maine, however, the business increased at such a pace that he soon had to devote all of his time to it. His plant produced the first cinder block made in Maine. It consisted of an open-air shed with a couple of small 2-block machines, a hand mixer, hand carts, and a few wooden racks. That summer, during which a number of important jobs were supplied, block were air-dried in the yard.

Demand soon required 7-day oper-

The Maine Cement Products Company's booth at the Bangor (Maine) Better Homes Show was visited by over 5,000 persons.

Pouring a concrete burial vault, one of the products made in this plant.

Cubing cured block in the yard with a fork-lift truck; in the winter the cubed block are stored indoors.

ation. The equipment was then enclosed for cold-weather operation, and curing "kilns" were built which consisted of shacks lined with insulation board and tar paper and heated by raw steam pipes and portable heaters. In 1948 this plant produced 100,000 standard 8-in. block, which was about 10 percent of the 1,000,000 units produced that year by the 74 plants then operating in Maine.

Because the backlog of orders grew during the winter, the company ordered a Besser Super Vibrapac machine with a mixer and all other accessories in the spring of 1949. Two masonry kilns were built that year and other improvements were made. In 1949 the output of this plant was 400,000 8-in. equivalents, which was 33 1/3 percent of the 1,200,000 block used in Maine that year.

The outlook for 1950 was such that production was stepped up to 720 block per hour. Cubing was adopted, a trailer-truck fleet was purchased, and two more kilns were built. In 1950 the output was over 900,000 units—60 percent of the 1,500,000 used in Maine.

In 1951 further improvements were made which increased capacity to take care of the growing demand. In that year the company made and delivered 1,500,000 block—75 percent of the 2,000,000 used in the state. It might be added that by that time most of the other 73 plants in Maine could not compete with efficient volume production, and there were only five plants in operation in the state. Moveover, since 1948 the price of blocks had been lowered 6 cents to about the same level as in other states.

Further expansion at Milford was not practical; so construction of the plant at Veazie was started in October, 1951. In spite of the most severe winter in years the plant was completed and in operation on May 2, 1952, and Milford was closed.

All new Besser equipment was installed at the new plant which has a capacity of 15,000 units daily. At this time also the company was incorporated, with Mr. Storey as president. Soon afterwood arrangements were completed with the Bancroft Martin Rolling Mills of Portland, Maine, to produce block at their concrete pipe plant at North Leeds. Modern concrete curing rooms, bins, etc., were installed and equipment was added for making lintels and roof slabs. In June, 1952, a subidiary, the Bangor Wilbert Vault Co., was formed, and the Aroostook Cement Products Company, Presque Isle, Maine, was acquired.

Production was held down somewhat by the steel strike in 1952, but the output exceeded the previous year's volume. In 1953 over 1,950,000 block were produced, as well as a large volume of other products. (The demand in 1954 to date has made additional capacity necessary; so a new plant is now under construction at Portland, Maine. This will be similar to the Veazie plant here described.)

The history of this company is unusually interesting, but its operations also deserve attention. The Veazie plant receives its sand and pea gravel from a producer nearby and cinders are supplied from paper mills about 65 miles distant. The cinders are passed through a New Holland hammermill and then through a roll crusher which reduces to ⅜ in. minus. Large stockpiles are maintained for year-round operation.

The plant is built against a hillside, so that aggregates can be discharged from trucks into four 55-cu. yd. reinforced concrete bins, which also serve as a retaining wall for the back of the main plant building. Cinders, sand, bulk cement, and pea gravel are stored in these bins. A travelling weigh larry is used to batch from these bins to the 50-cu. ft. Besser mixer, and a skip feeds to the Besser Super Vibrapac block machine. This has electronic control, magnetic pallet return, and all the latest features. The 72-block Besser racks are handled by Erickson platform dollies. Cured block are cubed by a Besser machine, indoors in winter.

There are seven curing rooms, each with a capacity of 1,500 units; four of these are used for block and the others for various other products. Steam for curing, provided at 190 deg. F. by a 75-hp. oil-fired boiler, is introduced into the kilns through open 1½-in. pipes. About 1,500 B.t.u. of heat are required per block, and curing time varies between 4 and 6 hours, depending on the outside temperature.

Lintels, channel planks, and burial vaults are made in a separate room with a 30-cu. ft. mixer and a vibrating table. All items are handled with an overhead crane, and fork-lift trucks handle to the curing rooms.

Curing the vaults in this manner is credited with doubling production with only the usual number of men.

At this plant a Scoopmobile and a Wagnermobile are used for handling cinders and other materials, yard maintenance, snow plowing, etc.

For better, stronger window installations

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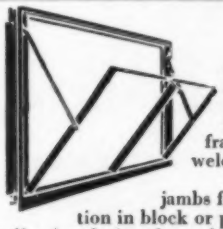
BONDERIZED STEEL BASEMENT WINDOWS



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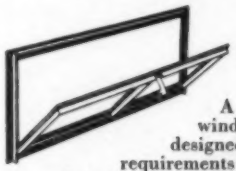
Sturdy 14 gauge frame, electrically welded throughout. Fins integral to jambs for easy installation in block or poured concrete walls. A redesigned cam latch and slotted opening allow greater tolerance, insuring positive operation and latching under all conditions. Available in three standard sizes, putty or puttyless glazing.



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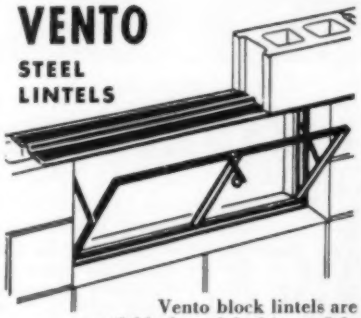
A real economy window especially designed to meet the requirements of lower cost housing. An attractive window of sturdy construction, smooth operation, two position ventilation and easy sash removal. Fin flanges at jambs for quick installation. Available in three standard sizes, putty type.

AND

VENTO STEEL LINTELS



Vento block lintels are available from 2 ft. 6 in. to 5 ft. Formed from 10 gauge hot rolled steel with stiffening crimp in center. Beveled edge provides masonry bond and seat for mortar. Saves costs through use with standard 6-inch and 8-inch blocks. Vento pressed steel angle lintels for brick construction also available.

ALSO casement, utility and barn windows. Write for full information.

VENTO STEEL PRODUCTS CO., INC.

254 Colorado Ave. Buffalo 15, N. Y.

Most of the blocks produced are used for industrial buildings, schools, and similar structures. The house foundation field is just developing, and the house wall market is being built up. Formbloc molds are used for reinforced walls in home construction. The largest private job supplied to date was the Mercy Hospital in Portland, in which 165,000 standard 8-in. cinder units were used for floors and backup. The largest government job was the Limestone Base, a B36 bomber base 175 miles northeast, which required 325,000 8-in. equivalents. Up to 20,000 were delivered in one day.

The truck fleet now consists of nine units for delivering block and two dump trucks. The average load is 750 units. Four of the block trucks are Chevrolet and Mack 10-wheelers; the others are tractor-trailers. The 10-wheelers are preferred as they are the only ones which can deliver to the job site when the ground is soft, especially in the spring. From this plant cinder block is delivered over the entire state; and gravel concrete is delivered to the entire northern part of the state and for 75 miles south of the plant. The southern part of the state is supplied by the Leeds plant. On the long hauls the trucks leave the plant at midnight as the lighter traffic at that time makes for more economical operation.

Trucks are operated strictly as a delivery service and on a non-profit basis. In five years of operation delivery charges and truck costs have not varied over 10 percent. The average delivery cost in the state is about 5 cents and the longest haul—240 miles— costs 8½ cents per standard block.

Quality and mass production have been largely responsible for the company's success, but intelligent advertising and sales efforts have also helped. The company employs three field salesmen and a sales manager and also has dealers in Portland and Bangor. Advertising also includes radio time and newspaper and magazine space. Exhibits at fairs and home shows have also been very successful.

Air-entraining cement is used exclusively, and the yield averages 25 sand-and-gravel blocks per bag. About 2 percent of calcium chloride is used all year. The blocks weigh 42 lbs. each and test 1,400 p.s.i. gross area, far above the 1,000-lb. specification. Cinder block are made with 20 percent sand; these weigh 34 lb. each.

COMMENT

from the

BUTLER ENGINEER

. . . of Taconite and Women's Names

Made a most inspiring trek into the vast iron country of northern Minnesota. Five companies are spending *800 million dollars* in an enormous development to mine taconite. Always thought taconite was a low grade, unprofitable iron ore. 'Tain't so. It's just difficult to get at and get out.

Anyway, they're building a new town to house 10,000 people and expanding another to house 5,000 more. Those projects will involve many hundred thousand yards of concrete . . . Now you've guessed the "why" of my visit. *Whenever there's concrete in your future you'll see the Butler Engineer looking at you in your crystal ball.*

This enormous development (and 800 million dollars is only the beginning) will change the economy of our country — and for the better. There'll be enough iron for a thousand years.

Noticed many of the towns in that sparsely populated area bear women's first names, such as Virginia, Effie, Ruby. Asked why. Won't repeat the answer here as directly as it was given me, but it seems that in the early days those bearded, lusty and hard-working gentry of the mines and timber liked moments of relaxation away from pickax or saw. Certain gay members of the feminine gender who ventured into that wilderness to provide relaxing roofs were honored by this geographical immortality.

Am I obscure? Take the "t" out of immortality.

Great Day! The orders that have come in for Ready Mixed and Roadbuilders Plants!

Recession? How do you spell a Bronx cheer?

The Butler Engineer

BUTLER BIN COMPANY

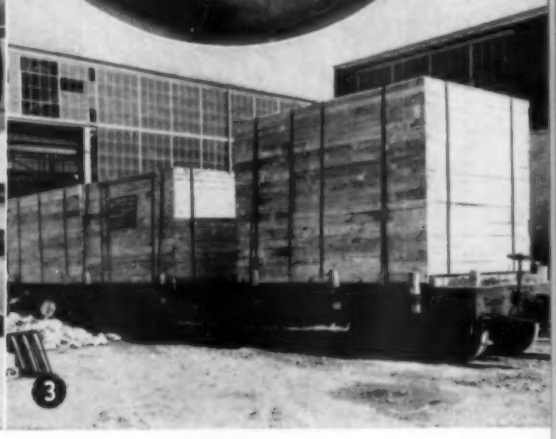
WAUKESHA, WISCONSIN

BESSER SERVICE *is World-wide*

Here is Jack Franklin, District Manager of the Besser New York office. Similar offices are maintained in ten other metropolitan areas.

1

2



3

4

Besser Service knows no

From any part of the world, where Besser VIBRAPAC Machines are operating, any call for service gets prompt action. Besser servicemen are ready to travel by air, by rail, by car or by steamship... to take care of urgent service requirements.

1. Besser representative arriving by plane to render prompt service.
2. Loading urgently needed parts into plane for some far-away destination.
3. Export-boxed VIBRAPAC leaving the Besser plant for foreign service.
4. One of several Besser Service Parts Warehouses. This one is located at Buffalo, N. Y.

Illustrations above and at right show Besser factory storerooms well stocked with service parts and attachments.

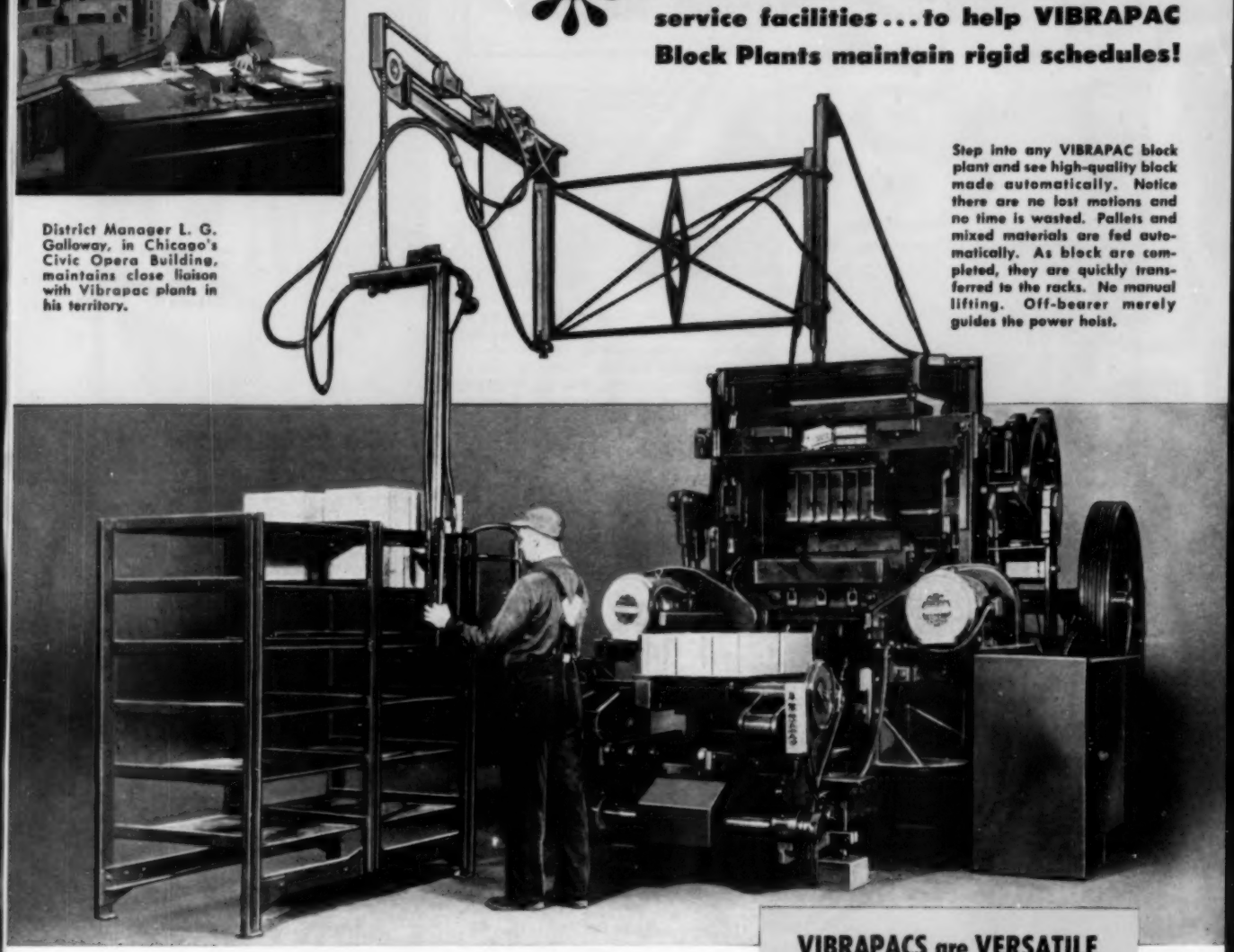
BESSER
50th Anniversary
1904-1954

...a Half Century of Concrete Masonry Progress

Coast to coast... and in many foreign countries...Besser provides unequalled service facilities... to help VIBRAPAC Block Plants maintain rigid schedules!

District Manager L. G. Galloway, in Chicago's Civic Opera Building, maintains close liaison with Vibrapac plants in his territory.

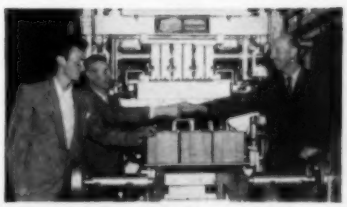
Step into any VIBRAPAC block plant and see high-quality block made automatically. Notice there are no lost motions and no time is wasted. Pallets and mixed materials are fed automatically. As block are completed, they are quickly transferred to the racks. No manual lifting. Off-bearer merely guides the power hoist.



geographical boundaries

The Besser Manufacturing Company maintains eleven district offices, strategically located throughout the United States . . . warehouses with stocks of parts and attachments in three cities . . . and factory-trained representatives ready for prompt and efficient service . . . anywhere.

In addition, Besser representatives and servicemen make regularly scheduled check-up calls on VIBRAPAC Block Plants . . . to anticipate, as far as possible, the immediate and future service requirements of any plant equipment. World-wide sales are matched by world-wide service . . . dependable Besser Service that block plant operators appreciate.



Visitors come to the Besser Plant at Alpena, from all over the world. Here Lofter Jansson and Jon Loftsson of Reykjavik, Iceland greet John G. Wortherspoon of Adelaide, Australia.

If you want to produce high-quality block, on a fast production basis and with a minimum of "down-time", you can safely entrust the job to VIBRAPAC machines, backed by Besser service.

VIBRAPACS are VERSATILE

The flexibility of the Front Pallet Feed Vibrapac, and the advantage of the original Besser principle of making all sizes and types of block on one set of Plain Pallets, permit Vibrapac plants to supply a wide variety of block for the entire building.

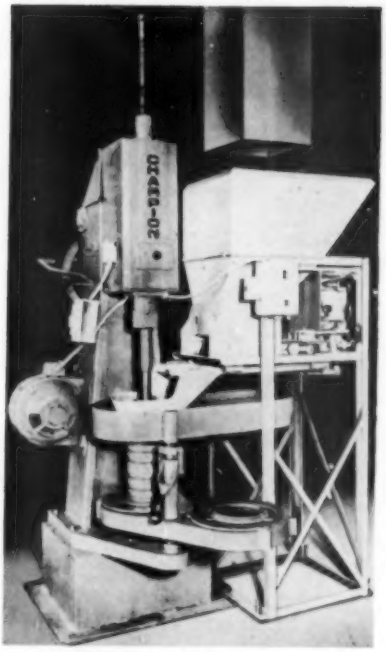
BESSER MANUFACTURING COMPANY • Alpena, Michigan, U. S. A.

J 3495

CM New Machinery and Supplies

● Practical moisture control for every batch of concrete is provided instantly with this electronic instrumentation system devised by Colorado Pre-Mix Concrete Co. The moisture content of the fine aggregate is seen at a glance on the recorder (left) while the weight compensator (above) provides the figures for readily adjusting the moisture at different batch weights.

Our Identification No. 101



● Drain tile manufacturing is essentially a local industry and need not be restricted to regions having clay and coal deposits. Concrete Equipment Co. says, offering this one-man, automatic, electric Champion machine for making concrete drain tile. The machine can make five tile per minute. It occupies but 16 sq. in. of floor space and needs only a simple concrete base. A 5-hp. motor powers the unit.

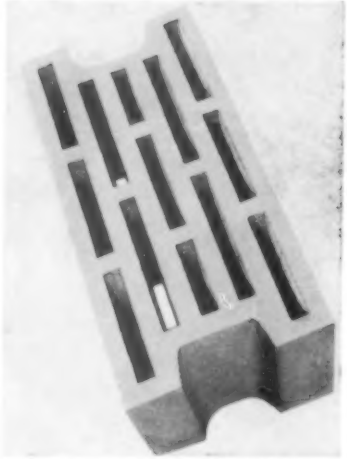
Our Identification No. 103

● Available Load-Hauler truck chassis are tailored to suit the needs of ready-mix haulers in areas where weight limits are stringent. The unit shown here will haul seven yards legally with Jaeger 5½ and 6½-yard mixers.

Our Identification No. 102

● This nimble 12-cu. ft. scoop loader by Jaeger should prove interesting in concrete plant operations for loading materials, charging mixers, yard maintenance, snow removal, towing, etc. The driven front wheels serve at all times as the fulcrum of the load, giving maximum tractive effort. Controls are hydraulic.

Our Identification No. 104

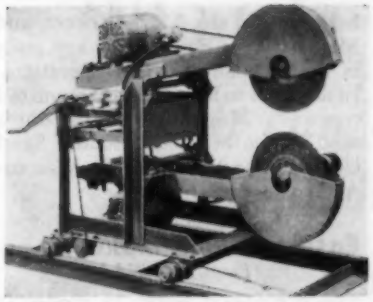


● Added strength, lowered building costs, moisture, sound and heat insulation, and several other virtues are claimed for this new design for concrete block developed by American Webco Corp. Plain pallet machines and conventional aggregates are used for the block. Block firms will be franchised to make this block.

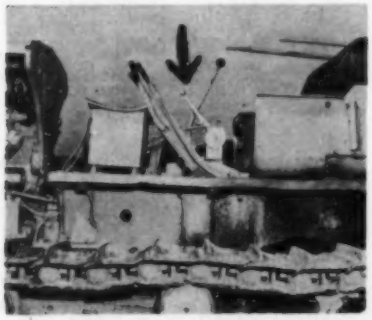
Our Identification No. 105

● Mounting the mixer engine to the rear and the transmission on the side of the flush water tank, the distance from the front of the mixer to the center of gravity has been reduced 20 inches on this new Blaw-Knox truck mixer, in 5½ and 6½-yd. sizes. Bigger payloads on shorter wheelbases result.

Our Identification No. 106



● This new two-headed saw has been developed by Mid-West Concrete Pipe Co. for cutting plain and reinforced concrete slabs, pipe, block, etc. Blades operate independently, but complete cuts can be made running both close together. Smaller and thinner carborumdum blades are used to save on costs.
CIRCLE 107



● The performance of engines is considerably improved with this throttle control device developed by Link Belt Speeder Corp. The stepless, friction-type control holds speed constant, once set, despite vibration. It mounts anywhere a governor cable can be attached and provides an infinite range of engine speeds.
CIRCLE 108

● This low-priced block splitter just introduced by Fleming Mfg. Co. eliminates the hydraulic system to reduce maintenance and provide simplicity of operation. It accommodates 24x8-in. block at the rate of 840 cutting strokes an hour. A 3-phase gear-in-head motor drives the 1025 lb. unit.
CIRCLE 109

New Literature

LIGHTWEIGHT BLOCK for economical, durable farm building construction is described in this *Celocrete* bulletin.
CIRCLE 110

INTERNAL VIBRATORS made by *Roeth* give higher speeds with less damaging effect to the bearings, this brochure claims. Various units are shown, as well as several attachments for other concrete work.
CIRCLE 111

ROOF TILE of concrete offers many utilitarian advantages to home owners and builders this *Empire Tile Machinery* brochure points out. Empire furnishes the tile-making machinery and helps you promote the product.
CIRCLE 112

COMPRESSION TESTER for blocks up to 8x16 and cylinders up to 6x12 is shown in this *Forney* literature. The new low-priced QC-125 weights less than 1,000 lb.; produces up to 125-ton pressure.
CIRCLE 113

SAVE FUEL COSTS. The Consolidated Duo Boiler will cut your fuel costs by one-third, this *Burkhart* literature claims.
CIRCLE 114

PLASTICIZER. Forrer's 240-B reduced culls by more than 40% at a cost of only ½¢ per sack of cement a prominent block maker reports in this *Spray-O-Bond* bulletin.
CIRCLE 115

PORTABLE LOADER. The lightweight *Power-Pack* line includes tire-mounted conveyors for loading aggregate, finished block, bagged materials, etc. to several heights.
CIRCLE 116

STEEL FORMS. Filled with photos of forms at work in all sorts of heavy concrete construction, this 50-page *Blaw-Knox* bulletin shows the versatility of these forms.
CIRCLE 117

METAL-SEEDED FLOOR surfaces of concrete resist heavy impact and high abrasion, this *Flash-Stone* bulletin says. The eight-inch veneer of concrete and metal chip forms a non-spalling, non-crumbling, non-slip armor over fresh Dynapakt concrete topping.
CIRCLE 118

JULY 1954

MORE INFORMATION PLEASE

THE CONCRETE MANUFACTURER
431 S. DEARBORN ST.
CHICAGO 5, ILLINOIS

Please send more information on items described in editorial columns of this issue, as circled below.

101 102 103 104 105 106 107 108 109 110

111 112 113 114 115 116 117 118

Name_____ Title_____

Company_____

Address_____

City_____ Zone_____ State_____

3 Plants Serve St. Louis

(From page 268.)

striking color scheme has been adopted, consisting of blue for the mixer proper, white for the truck cab, and red for the fenders. Damaged or weathered paint is quickly replaced, and each of the units is washed, sprayed, with paraffin oil and garaged at the end of each day.

The second floor of the garage at Page Avenue is used as a storage warehouse for the varied line of general building materials marketed by Majestic. Natural topography was used to good advantage by backing the structure up against a bluff, so that trucks can unload directly onto the warehouse floor. The materials handled include cement, lime, reinforcing steel, wire mesh, form ties, glass block, metal sash, masonry paints, and expansion strips.

Although Majestic's ready-mixed-concrete operations are of comparatively recent origin, the present concern actually dates back to 1931, when the sons of Michael J. Mohan took over the block and general building material business with which their father had been associated for some years. Six Mohan brothers (Albert, John, Tom, Mark, Robert, and Michael J. Jr.) now man key posts in the company's varied operations. In addition to block and ready-mixed concrete, Majestic also produces sand as the St. Louis County Sand Company, and gravel as the Missouri Aggregates Company.

MEET A MONEY SAVER

Latest Model "C"

A NATIONAL CAR SHAKER, in service 4½ years at a ready-mix plant, has unloaded over 1 million tons of sand and gravel in all kinds of weather. Only one man has operated the shaker. Estimated savings — $23,000.

NATIONAL CONVEYOR & SUPPLY CO.
348 N. Harding Avenue
CHICAGO 24, ILL.

Eastern Block Maker

(From page 275.)

weight averages about 42 lb. Interchangeable parts make it possible to produce the various sizes of batter block with just one mold box. The conversion job from one size to another usually takes about an hour. The subject plant generally runs two sizes of units in a day, the changeover being carried out during a midday shutdown.

The Dagostino batter block is adapted to the making of 48-, 42- or 30-in. manholes, each course of units accounting for a 6-in. diameter change. Thus 11 batter block compose a course of units in which the ring diameter is reduced from 48 to 42 in., 10 block for the reduction from 42 to 36 in., 9 for the reduction from 36 to 30 in., and 8 for the final reduction from 30 to 24 in. Barrell block are made for each of the major diameters at the rate of about 6,000 units per 8-hr. day. In placing the units in the field, only the horizontal joints are mortared. Mortar is also placed in keyway slots located in the ends of the units to increase stability.

Dagostino Building Blocks was founded by Frank Dagostino in 1922. His sons Andrew, Lawrence, and Kenneth now operate the business as a partnership. The company is well pleased with the operation of the new mold box attachment, and it reports a steady increase in demand for the manhole and catch basin units since they were introduced several months ago.

Swimming Pool Construction Topic of New N.C.M.A. Booklet

To furnish members of the National Concrete Masonry Association with information on the construction of swimming pools, N.C.M.A. has prepared a booklet, *Notes and Typical Details on the Use of Concrete Masonry in Small Swimming Pool Construction.* It has been announced that members may obtain additional copies of the brochure at 25 cents each plus mailing cost by applying to the association's Chicago headquarters.

In addition to wall design data the booklet contains suggestions which will aid in planning, constructing, and operating a small pool.

What Is Your Business Name?

It can cause confusion and may result in legal difficulties, even a fine or imprisonment

By HAROLD J. ASHE

CLEAR and unmistakable business identity is important to the conduct of a business. This identity not only has considerable value to a business owner in terms of good will and other intangibles; it may have far reaching legal implications. In spite of these considerations many a businessman permits confusion to exist in respect to his business name, when unquestioned identity is needed. Some even contribute to this confusion.

It is not uncommon for the owner of a concrete products venture to use two business styles. There have been instances in which several different styles have been used concurrently, to the bewilderment of those not in the know.

The exact *legal* name, personal or firm, under which a business is conducted should be the *only* name used for business purposes, and for identifying the place of business and trucks. Advertisements, letterheads, billheads, and everything else carrying the business name should reflect this *legal* name—and only this name —for identification purposes. (Brand names, of course, are not here at issue.)

Aside from legal aspects, this need for uniformity should be self-evident. It is difficult enough to keep one's business name before the public if only one name is used. Few people will preoccupy themselves trying to keep two or more names in mind; few will try to build up an association between two or more business names. This is just asking too much. Moreover, such alternating of names and name variants dissipates much of the effectiveness of paid advertising and other promotional efforts. It may even result in the misdirecting of some business to which a businessman is entitled. Not infrequently, failure to pin down a business name with exactitude can invite loss of trade to a competitor employing a similar name.

Consider the hypothetical case of a businessman whom we shall call Ted R. Jonas. His is a sole proprietorship, although he is legally known as the Jonas Concrete Products Company. This latter, then, is the style which should appear on all signs, printed matter, billboards, advertising matter and trucks.

Yet, after five years in business, Jonas appears to be still uncertain concerning his business name. It is little wonder that some customers are confused. His occasional advertisements refer to him only as "Ted Jonas —Concrete Products". A large sign on his office heralds the place as "Jonas Building Materials", and smaller signs on the window indicate that he is in the concrete products business. Most printed matter carries his personal name only, Ted R. Jonas, with a descriptive line underneath identifying what line he is in. An informational listing in the phone directory simply says, "Jonas for Concrete Products."

The foregoing is not an extreme case. There are many instances in which firm names do not even give a clue as to the person or persons owning the business. Yet here, too, owners alternate between use of their own names and fictitious names.

Large business firms—and some smaller ones—have long since found from experience that there is considerable value in exactness of identity, right down to abbreviations, hyphens, and commas. The eye registers this identity in strange ways, and may unconsciously reject any change, however slight, which may tend to obscure clear identity. Thus, if "company" appears in a business style, it should be either spelled out in full or be abbreviated consistently. "Brown & White" should always appear exactly that way, once it has been adopted as a style; it should never be rendered "Brown and White" or "Brown-White", etc.

Even without the element of confusion, it is important that an exact and undeviating style be used if the business name, in all respects, is not identical with the owner's name. Thus, in the case of our hypothetical Mr. Jonas, the "Jonas Concrete Products Co." is a fictitious name, whether Mr. Jonas is aware of this fact or not. It may be "common knowledge" that Ted R. Jonas is the sole owner of the Jonas Concrete Products Co., but this is not good enough in the eyes of the law, if certain legal requirements have not been met. The employment of Jonas's last name as a part of the style does not remove the business name from the fictitious classification any more than if the style were the "River View Concrete Products Co.".

Practically all states now have laws applying to the use of fictitious names for business purposes. These laws usually provide penalties for their violation, in the form of fines or imprisonment, or both. In addition, some states provide that violation of the fictitious law statute places the violator in a position where he can be sued but cannot himself sue. Thus, while his creditors are not penalized by his failure to comply with the law, he himself cannot resort to court action to protect his business or collect debts owed him.

The fictitious name law varies from state to state. Therefore, a business owner should be governed by the laws of his state, preferably on advice of legal counsel.

However, the law in Texas is fairly representative and is here cited only to show the general principles involved. It requires that any person conducting or transacting business under any assumed name, or under any designation, name, style, corporate or otherwise *other than the real name* of each individual conducting or transacting such business must file with the county clerk of the county or counties in which he proposes to conduct such business. His certificate to conduct a business under a fictitious or assumed name must state the name of the business and disclose the name of each person owning the business, together with the address of each.

In the event of a change of ownership of any business operating under an assumed name, these facts must be filed with the county clerk. This certificate sets forth the fact of withdrawal from the business, or the disposition of an interest in the business.

The penalty for failure to comply is severe in Texas. A fine may be imposed of not less than $25 nor more than $100. However, each day of violation constitutes a *separate* offense.

If a domestic or foreign corporation is lawfully doing business in the state, it is exempt from complying with the foregoing provisions.

Other considerations aside, failure to file a certificate of withdrawal from a business may result in a former owner or co-owner being held liable for the obligations of the business.

It cannot be emphasized too strongly that where a fictitious business name is being employed, or even if there is a reasonable doubt as to whether a business name might be construed as being fictitious, and the law has not been complied with, common sense dictates that the defect be remedied. Many long-established firms have never complied with the law.

"BIG TIME" ADVANTAGES
IN THIS COMPACT AND RELATIVELY INEXPENSIVE
KENT SUPER BLOCKMAKER

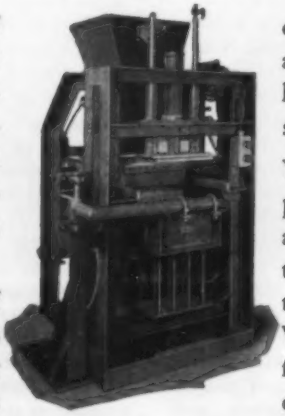
Here is an entirely new semi-automatic machine ideally suited for SMALL and MEDIUM block plants.

A SPECIAL air cylinder-powered press head makes possible a faster cycle and assures blocks of uniform height and equal density regardless of the material used.

PRICED BELOW any machine of comparable performance, the SUPER BLOCKMAKER consistently produces blocks at a rate of 5 per minute from any aggregate and has a peak output of 6 blocks per minute.

Equal delivery of aggregate to the mold box is effected by agitation and mold box vibration assures uniform block density.

A simple push of a button starts cycle during which various operations are automatically handled in sequence.



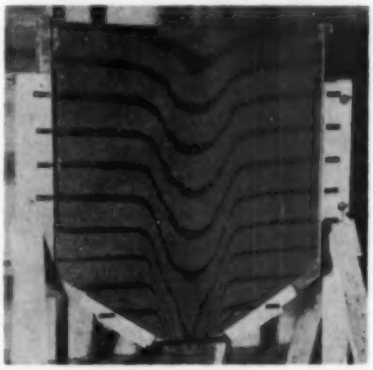
You'll be surprisingly pleased at the comparative low cost of this machine. Write TODAY for illustrated circular.

The KENT MACHINE COMPANY
CUYAHOGA FALLS, OHIO
CONCRETE PRODUCTS MACHINERY SINCE 1925

Flow of Solids Investigated In Eastern Research Center

The flow of solid materials in chutes, bins and hoppers is currently being investigated at the research laboratories of the Richardson Scale Company, Clifton, N. J. Engineers know little about the characteristics of solids in flow, particularly in bins and similar vessels.

To test equations and theories evolved by research engineers the solids-flow laboratory at Clifton is equipped with a hydraulic load cell and a series of varying bin sections. With the arrangement, it is possible to study closely the relationship between various heights of material in a bin and the pressures at the discharge opening.



● A bin cross-section showing free-flowing material in the process of being discharged. This view shows the flow commencing in a central core. As a result of such photographic studies, it appears that considerations of bin design should be based upon the flow of material in this centrally located area.

A model bin section with variable side slopes and one glass side was constructed to permit observation of typical flow within a bin. Photographs and motion pictures have been taken of numerous flow runs and filed for future reference.

Another piece of original equipment built in the lab is a machine called a K-determinator, which evaluates the relation between lateral and vertical pressure for various materials under load conditions in a bin.

A drain tile and block plant will be erected at Belle Center, Ohio, as a division of the Richwood Concrete Products Company, Bellefontaine, Ohio. Thomas McMahan and George Hunt Jr., Richwood, Ohio, have purchased land at the west edge of Belle Center for this plant.

Study Shows Mortars May be Culprits In Masonry Wall Cracking Problem

A RECENT study by J. W. McBurney at the National Bureau of Standards concludes that cracking of masonry walls may be caused by the gradual hydration and expansion of mortars containing free magnesium oxide (MgO). Present in large amounts in normal hydrated dolomitic (magnesian) limes and in some masonry cements, the magnesium oxide gradually combines with moisture, expanding and causing the failures. The Bureau's conclusions are based on measurements made of expansion in experimental brick walls and on investigations of failures of masonry walls in certain buildings, as well as on the study of published information.

Partly as a result of earlier NBS work, the effect of delayed hydration of magnesium oxide in causing expansion of concretes and of lime-gypsum finish coats on plaster is now well known. Delayed hydration as a cause of damage to brick masonry appears to have been generally overlooked, however. A few investigators have pointed to mortar expansion as a source of difficulty, but the tendency has been to blame mortar troubles almost exclusively on shrinkage.

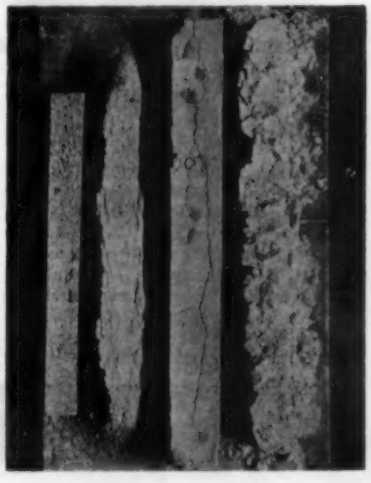
To help resolve uncertainties about the matter, the Bureau constructed two experimental brick walls or piers, 7 ft. high by 3 ft. wide by 8 in. thick, on the NBS exposure test site. Mortars used were mixtures of portland cement and sand, to which were added dolomitic hydrated limes containing high percentages of unhydrated magnesium oxide. Several different cement-lime-sand mixtures were used for different faces of the walls. The Chicago common brick used for the walls had been exposed to the weather for 2 years before use, so that hydration of any lime in the bricks were presumably complete; any change in dimensions of the wall could be attributed to the mortar. Two metal plugs were embedded in the face of each wall, with vertical separations of about 20 in. Changes in distance between small holes at the centers of each pair of plugs were measured at intervals over a period of nearly two years, using a Whittemore strain gauge. Data thus obtained were plotted in terms of percentage of change in the height of the brick wall.

All of the experimental wall faces expanded substantially with time, by measured amounts ranging from about 0.32 percent to about 0.56 percent in less than two years. This was roughly five to ten times the expansion shown by a comparison experimental wall in which the cement-lime mortar was made with high-calcium hydrated lime (free from unhydrated magnesium oxide). The percentage increase in height appeared to depend on the proportion of lime in the mortar and on whether the lime was dolomitic finishing hydrate or dolomitic mason's hydrate.

Measuring the vertical expansion of an experimental brick wall at the National Bureau of Standards. Several of these walls were constructed, using different mortars, to determine whether certain mortars were subject to shrinkage or expansion.

Corner of an Iowa school building, showing serious cracking of masonry. The National Bureau of Standards blames the brickwork failures in this building on the use of a mortar that gradually expanded.

Effect of autoclaving on mortar test bars at the National Bureau of Standards. All bars were initially the same length before they were heated under steam pressure for several hours. The control bar (left), consisting of portland cement and sand, has not expanded. The other bars, made of various combinations of portland cement, sand, and a certain magnesian masonry cement, have all expanded and crumbled.



Results of investigations of masonry failures in buildings led to the same conclusion as the measurements of the experimental walls. At about the time when the experimental walls were being studied, seven masonry failures in Iowa were reported to the Bureau by the Structural Clay Products Institute, and the Bureau made a careful study of one of these Iowa buildings. Since then several acute cases of masonry expansion and cracking on buildings in Wisconsin have been reported to NBS. The one factor common to all the Iowa and Wisconsin buildings was the use of a masonry cement that contained excessive amounts of unhydrated magnesia.

One structure investigated by NBS researchers was a two-story school with brick walls and structural clay back-up. Defects attributable to mortar difficulties had become noticeable within a year after construction, and had become acute when the building was examined two years later. Many of the mortar joints were cracked; walls were bowed outward, as much as 2⅜ in. in a 25-ft. height; the corners of the concrete foundation had cracked; the frames of two fire-escape doors had lifted; windows were jammed; the corners of the parapet had been pushed noticeably outward; and the gymnasium roof, originally designed to drain to one corner, had shifted so

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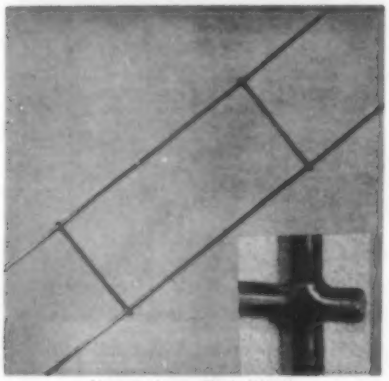

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that it no longer drained. Various other defects were visible.

Samples of mortar from the failing walls and also samples of unused masonry cement left over from the original construction were analyzed and tested by the Iowa State College and by the National Board of Standards. The masonry cement was essentially a hydraulic dolomitic hydrated lime, containing a high percentage of unhydrated magnesium oxide. Test bars were made from the unused masonry cement. When these bars were exposed to saturated steam under pressure for several hours, they expanded abnormally. From these tests and other evidence the NBS investigators conclude that the school's masonry failures resulted from expansion accompanying delayed hydration of magnesium oxide in the magnesian masonry cement used in the mortar.

As a result of its investigation, the Bureau offers several recommendations for preventing and remedying masonry failures caused by this type of delayed expansion. First, mortars should be made only from those masonry cements and cement-lime mixtures whose linear expansions do not exceed 1.0 percent when tested by the American Society for Testing Materials methods (ASTM C 151-49). Second, in the absence of tests, only Type S (Special) hydrated lime, or putty made from high-calcium quicklime, should be used. Such putty should be soaked for not less than 24 hours and otherwise handled as prescribed in the appendix to the A.S.T.M. Standard Specifications for Quicklime for Structural Purposes (C5-26). Third, when failures develop from use of insufficiently hydrated materials, costly repairs such as cutting out and repointing of mortar joints should be delayed, if possible, until the hydration of free oxide has approached completion—otherwise new failures will develop necessitating more repairs.

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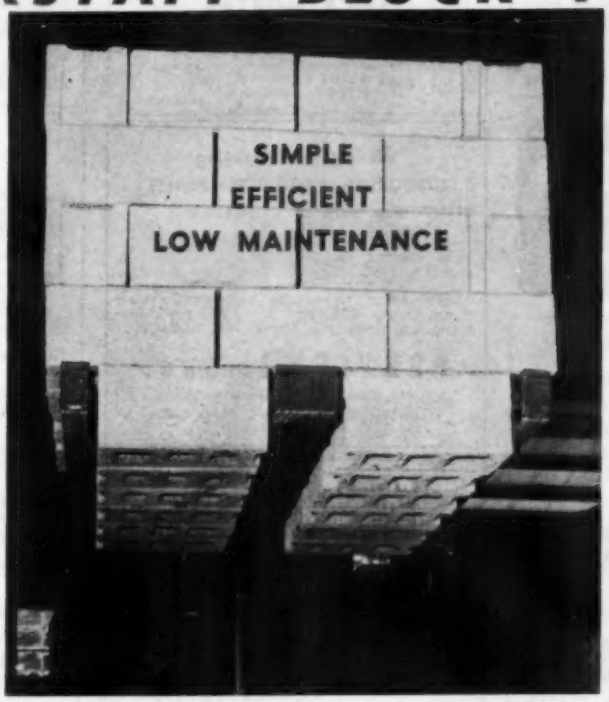

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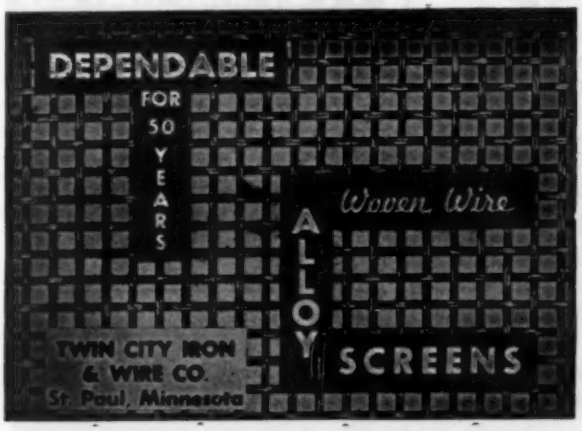

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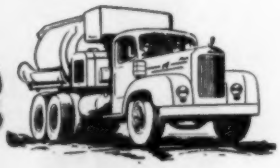


That's what the Hamilton Gravel Co., prominent and progressive operator of Hamilton, Ohio, proved to its satisfaction soon after purchasing its first Mack six-wheelers only a year ago.

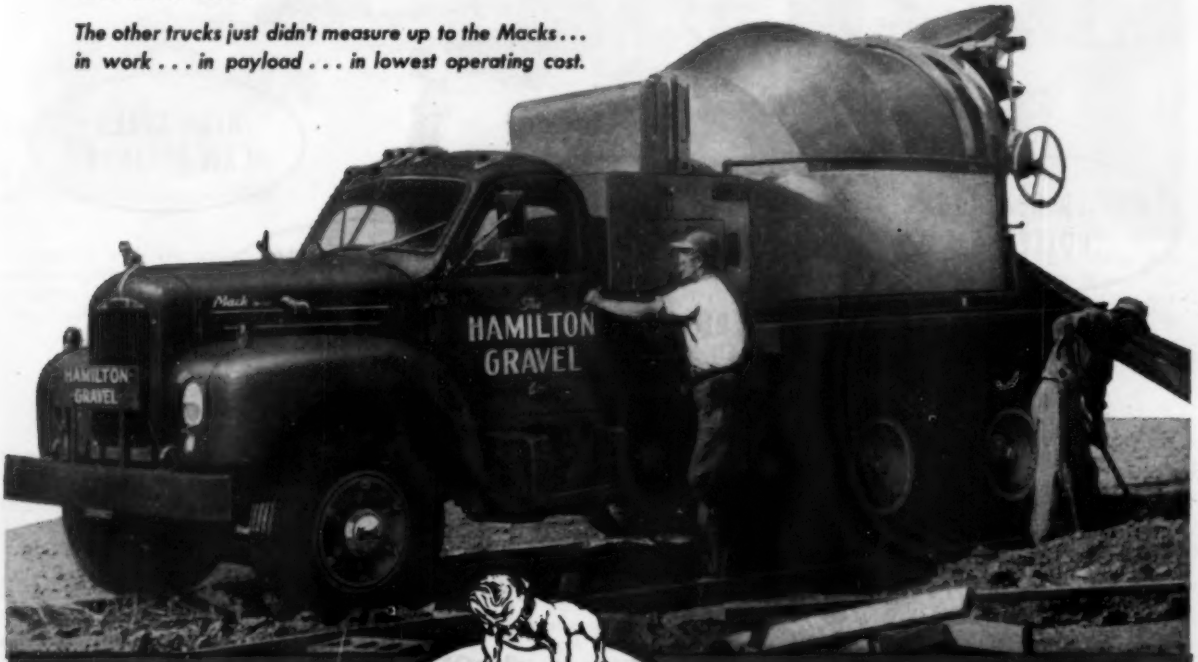
In a business where reputation depends upon reliable service and truck operating costs determine profit margins, Hamilton tested its two Mack units against all other-make trucks in its fleet, with these results:

The other trucks just didn't measure up to the Macks... in work... in payload... in lowest operating cost.

And so, despite higher initial price, Hamilton Gravel Co. bought more Mack six-wheelers.

If, like Hamilton, service and profits are your concern, you can't afford not to own a Mack!

WHEREVER YOU SEE TOUGH JOBS ...THERE IS WHERE YOU SEE MACKS



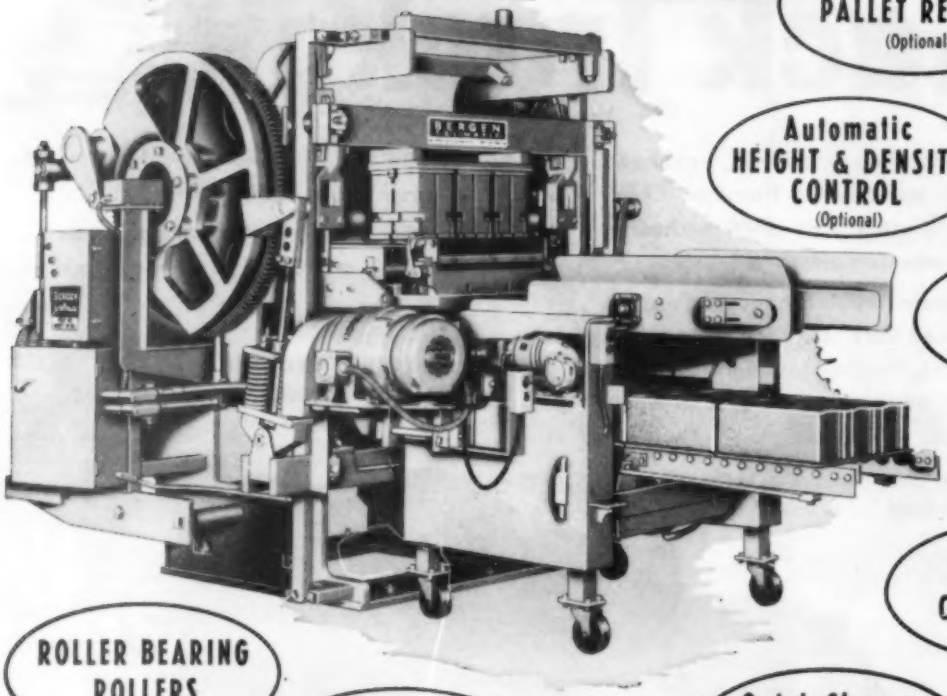
Only Mack six-wheel trucks offer the advantages of Mack's Balanced-Bogie with its exclusive Power-Divider.

Mack TRUCKS

Mack Trucks, Empire State Building, New York 1, N. Y. Factory branches and distributors in all principal cities for service and parts. In Canada: Mack Trucks of Canada, Ltd.

2272

BERGEN TRI-MATIC THE MACHINE WITH EXTRA FEATURES



FRONT PALLET RETURN (Optional)

Automatic HEIGHT & DENSITY CONTROL (Optional)

QUICK-CHANGE CUT-OFF DEVICE

HIGH SPEED CAM DESIGNS

ROLLER BEARING ROLLERS

BRONZE GUIDE LINERS

Quick-Change AGITATOR GRID DEVICE

ECCENTRIC LINK with ROLLER BEARING

OUTRIGGER BEARING SUPPORT

Bergen's Products are backed by thirty-three years of block-making experience . . . . .

PRODUCTION CAPACITY:
1000 BLOCK PER HOUR (8" EQUIVALENT)

AVAILABLE 4 WAYS:
1. WITH OR WITHOUT ACCESSORIES.
2. LEASE WITH OPTION TO BUY.
3. ON A LEASE BASIS.
4. OUTRIGHT SALE.

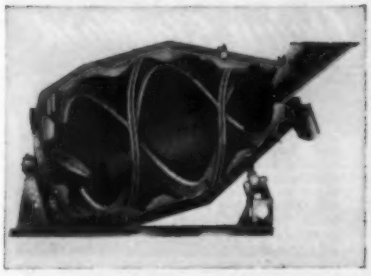
WRITE FOR BULLETIN

BERGEN MACHINE & TOOL CO., INC., NUTLEY, N. J.

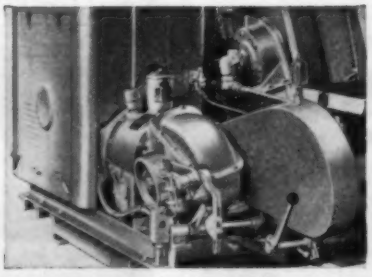
Millions of dollars worth of Jaeger 1954 models have been bought as a direct result of comparisons made at the Chicago show.

Jaeger is outselling short-lived truck mixers because

today's buyers buy for keeps



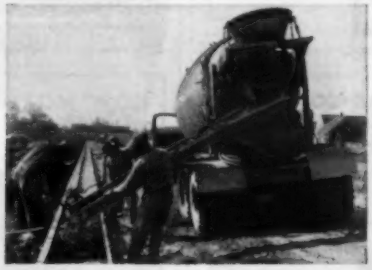
Compared with the paper-thin type of mixer, buyers prefer Jaeger's *8-gauge drum wrapper*, 5/16" head and bridge-truss blade feet, good for 8 to 10 years service.



In transmissions, they find nothing to compare with Jaeger's hydraulically actuated Super-Comatic, the perfected *finger-touch* one-lever transmission for truck mixers.

Buyers welcome Jaeger's water system that can jet 60 gallons a minute *through the head of the drum*. This faster water distribution means faster mixing and tempering.

Buyers equally approve this fast-charging and discharging open-end Maxi-Loader or Jaeger's long-proved sealed end loader.



No other unit offers anything to equal Jaeger's "To-the-spot" chute, extensible to 13 ft., for fast and accurate placement.

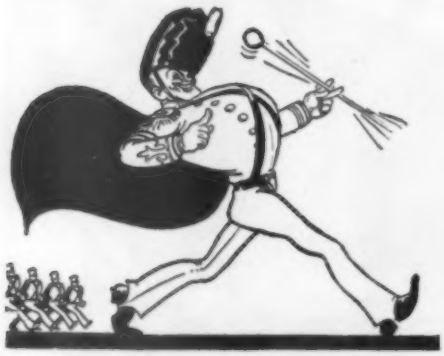
Add all these advantages to the *fastest* charging, mixing and discharging truck mixer on the market. That's the PLUS in Jaeger MIX-PLUS. Your Jaeger distributor will gladly supply complete facts to meet any payload problem. Ask him, or send for latest Catalog.

THE JAEGER MACHINE COMPANY

602 Dublin Avenue, Columbus 16, Ohio

LOADERS • AIR COMPRESSORS • PUMPS • MIXERS • PAVING MACHINES

"LEADS THE WAY" to Peak Block Plant Efficiency



OSWALT SERVICE

for VIBRAPAC OWNERS . . .

is the plant-tested method for insuring record machine output of premium blocks with minimum operating and maintenance costs.

The complete Oswalt Service for your vibrapac machines includes:

1 *Improved Vibration and machine changes to increase production 50% or more without sacrifice of quality.*
2 *New Simplified Height and Density Control to insure better and more uniform blocks*
3 *Shock-Free Ejector and Front-End Pallet Feeder to prevent green cracking and reduce culls to a minimum.*

OSWALT SERVICE is backed by years of research and development that have shown sensational results in scores of installations.

Write for name of Oswalt-Serviced plant nearest you.
Oswald Booklet has full details.

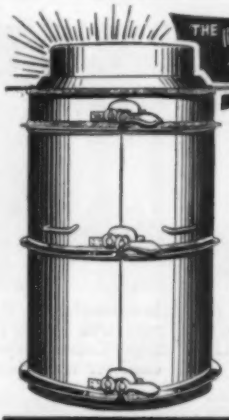
Two U.S. Patents have been allowed on Oswalt improvements, one on the Synchronized Vibration, and the other on the Lug Link used in speedup.

OSWALT ENGINEERING SERVICE CORP.

1335 Circle Ave., Forest Park, Ill. **Phones: EStebrook 8-3666, FOrest 6-3898**

CLEAN UP! PAINT UP! WITH **AGRASEAL**

TAMMS INDUSTRIES, INC., 228 N. LaSalle St., Chicago 1, Ill.



THE "Quinn Standard"

FOR CONCRETE PIPE

The Quinn Standard is known as the best the world over, wherever concrete pipe is produced and used. Backed by over 35 years' service in the hands of hundreds of Quinn-educated contractors, municipal departments and pipe manufacturers who know from experience that **Quinn pipe forms** and **Quinn mixing formulas** combine to produce the finest concrete pipe at lowest cost.

QUINN HEAVY DUTY PIPE FORMS

For making pipe by hand methods by either the wet or semi-dry processes. Built to give more years of service—sizes for pipe from 10" up to 120" and larger—tongue and groove or bell end pipe at lowest cost.

WRITE TODAY. Complete information, prices, and estimates sent on request.

Also manufacturers QUINN CONCRETE PIPE MACHINES

QUINN WIRE & IRON WORKS 1627 12TH ST. BOONE, IA

NOW MORE THAN 140 LICENSED MANUFACTURERS Producing

Patented
homeward
Concrete **STEPS**

A Small Investment That Pays Big Dividends

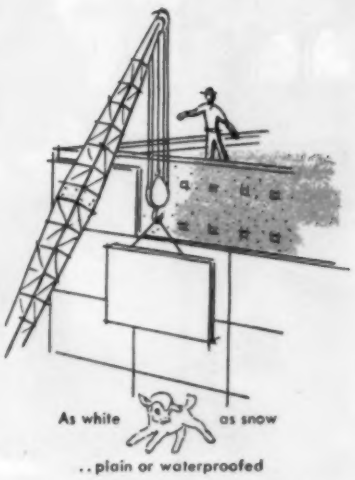
Homeward all metal forms are precision built to produce a product that requires no hand finishing.

The exclusive franchise for your territory may still be open.

For Complete Information Write
ROGER F. WILLIAMS, Licensor
3420 S. W. 9th St. Des Moines (15), Ia.

the whitest white cement . .

Trinity White



. . plain or waterproofed

ENDURING BEAUTY IN MASONRY

Some of the most noteworthy architectural structures of this generation are faced with architectural concrete units made with Trinity white cement . . . and Trinity white contributes to the beauty and permanence of many thousands of homes, stores and public buildings. Use Trinity white for terrazzo, stucco and wherever an extra fine appearance is desired.

A product of GENERAL PORTLAND CEMENT CO. Chicago • Dallas • Chattanooga • Tampa • Los Angeles

LET

FLEMING

MANUFACTURING COMPANY

MAKE MONEY for YOU

in your block plant!

WRITE TODAY
FOR COMPLETE INFORMATION,
PRICES, TERMS
ON THE

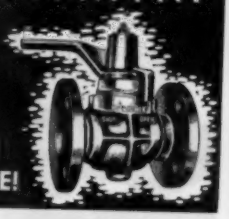
FMC-180 automatic concrete block machine
FMC-400 fully automatic double block machine
FMC Mixers; one, two, three and four-sack sizes
FREE—Concrete block plant layout!

189 FLEMING AVENUE • CUBA, MO. • Phone CUBA 400

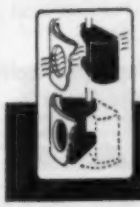
WHETHER THE MIXTURE IS

THICK OR THIN...

DeZURIK VALVES
HANDLE CONCRETE
WITHOUT LEAKAGE!
WITHOUT LUBRICATION!
WITHOUT MAINTENANCE!



DeZurik Easy-Operating Plug Valves are "naturals" on lines handling cement, or concrete mix, whatever the consistency. DeZurik's rubber-faced plug seals tight despite sand or aggregates in the flow, opening full or closing tight with an easy quarter-turn. DeZurik Valves require only an absolute minimum of maintenance; minor plug wear is self-compensating, and journals are non-lubricated. In case after case, when DeZurik Valves were installed, they drastically reduced replacement costs.



Manufactured in a full range of sizes and models.
Write for details and recommendations.

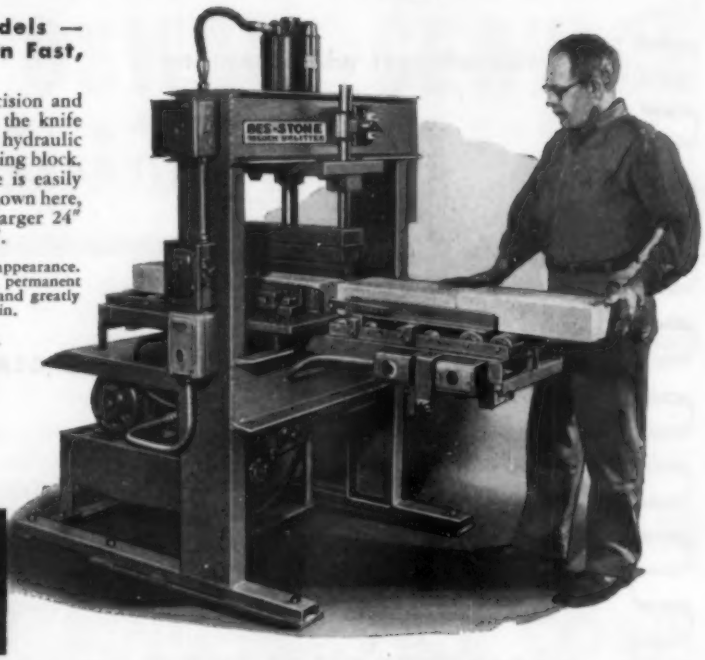
DeZURIK SHOWER CO.
SARTELL, MINNESOTA

BES-STONE Block Splitter

Made in 2 Sizes — 18″ and 24″ Models — Produces 960 Split Block per Hour in Fast, Automatic Operation

Splits block in a straight line, with speed and precision and with the utmost safety. The block is placed under the knife automatically . . . the blade descends with a smooth, hydraulic action . . . and the split block is ejected by the incoming block. The operator is always at a safe distance. Machine is easily adjusted for various block heights. The 18″ model, shown here, splits block 16″ or 18″ long, 1⅝″ to 8″ high. A larger 24″ model splits any length up to 24″, heights up to 8″.

BES-STONE is a new masonry unit with a quarried stone appearance. Can be produced in many sizes and in a series of attractive, permanent colors. No conflict with conventional block. It complements and greatly increases sales of standard stripper block. Write for Bulletin.



BES-STONE
the Split Block with Character

BESSER MFG. CO. • Complete Equipment for Concrete Products Plants • Alpena, Michigan, U.S.A.

A 7571-½-H

To Build Modern . . . *without Price Penalty* . . . Build of Cavitex

Among today's home builders the swing is to masonry. And the ultra-modern masonry is Cavitex. With eye-appeal and price appeal, Cavitex has unusual interest for building contractors and owners alert to modern trends.

Cavitex is new—in size, proportion, design and color range. Cored-out design provides insulation values and saves weight. Easily the most practicable unit for cavity-type wall construction. Ideal also, as veneer over frame, or as facing over 4″ concrete block. Available in pastel tones for exposed masonry interior walls.

Expensive? Just the reverse! Material for material, Cavitex costs less than frame. This low price made possible by manufacturing economies. Local plants convert local raw materials into units for local builders. Usual high costs of freight and distribution are practically eliminated. Write today for 4-color brochure and name of nearest local production plant.

W. E. Dunn Mfg. Co.
420 W. 24th St., Holland, Mich.

Local Manufacturing Opportunity

Many choice locations are open for the local manufacturing of Cavitex. Excellent opportunity for concrete products manufacturers. Each plant operates under franchise in protected territories. Cavitex machine available on lease or sale. If interested, ask for "Opportunity Unlimited."

X-2

Increase BLOCK Output with a Sturdy *Erickson*

The Platform Truck "Custom-Built" for your racks—from 60 to 108 or more 8x8x16 blocks.

"THE BACKBONE OF BLOCK PRODUCTION" is what users still call the Erickson Platform Truck. Its rugged dependability to handle loaded racks from block machine to kiln assures top speed production with no delays or shut downs. The Erickson platform picks up all racks from the ends and places them close together in the kiln—no wasted space. For faster operation Erickson now offers 4 speeds forward and 4 speeds reverse. We will build you a truck exactly suited to your racks and doorways. Also fork type trucks.

Write for Catalog on Complete Line.

Erickson POWER LIFT TRUCKS, Inc.

St. Anthony Blvd. & University Avenue n.e.
Minneapolis 18, Minnesota

Speed Up Hand Work with the BIG BULLY Air Hammer

- Clean Equipment
- Scrape Dry Concrete
- Clean Forms

Weight only 50 oz. 6 in. length, fits hand easily. Exclusive metering trigger delivers 0 to 9000 blows per minute. 28 tools available for 100 different jobs. Special tools made at your request.

Write for Complete Information Today

Clean Mixing Trucks Faster — *Clean Fragile Mixing Equipment Safely* — *Vibrating Concrete From Hopper*

Superior Pneumatic & Manufacturing, Inc. 4758 WARNER ROAD CLEVELAND 25, OHIO

TIME TESTED! *Butt Weld* JOB PROVED!

DUR-O-WAL

WITH TRUSSED DESIGN

The Backbone of Steel for EVERY masonry wall. Dur-O-wal is an electrically welded, custom-designed reinforcing member that lies fast in the mortar joint.

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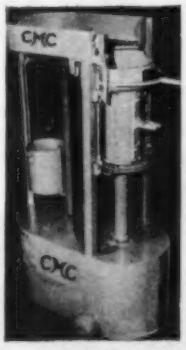

Here's Your Big Money Maker!

One machine to make drain tile in all the popular sizes. **TURN CONCRETE INTO GOLD SHECKLES** with the **MARVEL 8.**

- Modest Investment
- Low Operating Expense
- All year demand for **MARVEL TILE**

Bulletin and facts sheet upon request. Write today!

Concrete Machinery Company
Hickory 21, North Carolina

The World's Largest Manufacturer of Aluminum Molds for Concrete Yard and Garden Ornaments.

CHASE BLOCK RACKS, PLAIN STEEL PALLETS

Your best buy

Here's why . . . Standard style or specially designed, Chase racks meet your requirements. They're shipped painted and knocked down—assembly is easy—no special tools or welding needed. Chase experience means low prices and years of dependable service. Check Chase prices before you buy.

Chase FOUNDRY & MANUFACTURING CO.
2300 PARSONS AVENUE • COLUMBUS 7, OHIO

truck-men DO MORE FOR LESS . . . Says F. F. KIRCHNER

Model 40 loading a cube of blocks on truck

Model DHP with empty rack in front of kiln

"We have one two-ton Truck-Man Model 40 High Lift and two 4,500 lb. Truck-Man Model DHP's," says Mr. Kirchner, of F. F. Kirchner Material Company, St. Louis, Missouri. "What a combination! One DHP shifts loaded racks from the block machine to the kilns, from the kilns to the cubing area and then takes the empties back to the machine. The 40 takes the cubes to the yard, loads cubes from the yard on highway trucks and even unloads bagged cement and other materials that we receive. The other DHP is used for odd jobs and as an auxiliary in shifting racks when we are rushed.

"We've really got the handling problem licked now," he continues, "That DHP is the most efficient little work horse I've seen and it's so darned economical. Moving loaded racks eight hours a day on two gallons of gas —it's almost unbelievable.

"As for the Model 40, it's easy to see that it was designed from the ground up for block plant use.— Rugged, maneuverable, plenty of power, easily maintained and those big tires can go any place.

"Like everyone else, we're watching costs these days. So we were pleasantly surprised to find we could buy all three of these trucks for a lot less than the cost of two ordinary fork trucks. Our experience has proved to us that they are more efficient and versatile, too."

For information on how Truck-Man can cut costs in your operation, complete and mail this coupon today.

truck-man

DIV. OF KNICKERBOCKER CO.
571 LIBERTY STREET, JACKSON, MICHIGAN

☐ Have Salesman Call ☐ Send Info on Model 40
☐ Send General Catalog ☐ Send Info on Model DHP

NAME .....

ADDRESS ..... ZONE .....

CITY ..... STATE .....

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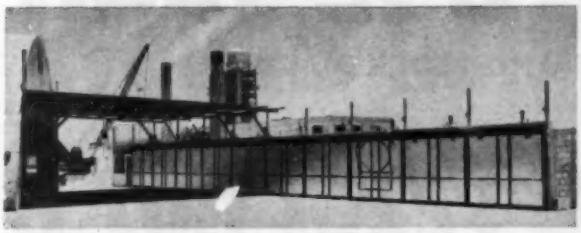
SAVE FUEL • REDUCE CURING TIME • CUT COSTS • UP PROFITS with *Standard* KILN DOORS!



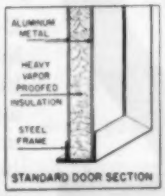
● This is the modern STANDARD kiln door installation of Portland Industries Inc., Riviera Beach, Florida. C. R. Wilson, the firm's Executive Vice President, writes: "Our Standard kiln doors have been very satisfactory."

To suit your individual requirements, three types of STANDARD kiln doors are available—the sliding carrier-type (shown above), the top hinge-type (which is pulled up by a hoist), and the side hinge-type.

CHECK THESE FEATURES

√ Heavy Aluminum Sheets on Both Sides of Thick Vapor Proofed Insulation.

√ Rugged Steel Frame.



STANDARD DOOR SECTION

Get the Best — Send for Details Now

STANDARD DRY KILN COMPANY

P. O. BOX 5708 . . . . INDIANAPOLIS 21, IND.

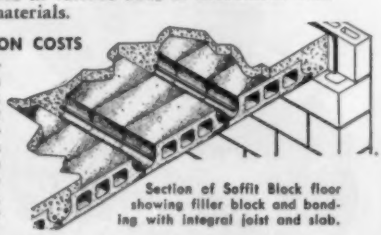
"I Find BOTH Profitable"

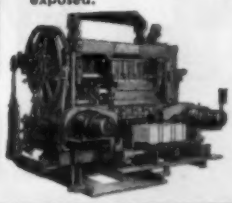
VIBRAPAC Block and SOFFIT Floor and Roof Filler Block

Vibrapac block plants are now adding to their profits by manufacturing Soffit Filler Block for floors and roofs. These units assure permanent, fire-safe construction, at low cost. Soffit Block provide maximum acoustical and insulation values with natural base for radiant heat installations. Made in various sizes to coordinate with other modular materials.

CUTS CONSTRUCTION COSTS

Temporary adjustable steel centers support Filler Block while slab and joist are curing. Conventional shoring is eliminated. The smooth, flush surface can be plastered, painted or left exposed.


Section of Soffit Block floor showing filler block and bonding with integral joist and slab.



BESSER VIBRAPAC

Vibrapac Block for walls, floors and roofs, in all styles and sizes, are made on a Besser Vibrapac, using one set of Plain Pallets. Fully automatic. No machine operator required. Write for descriptive literature.

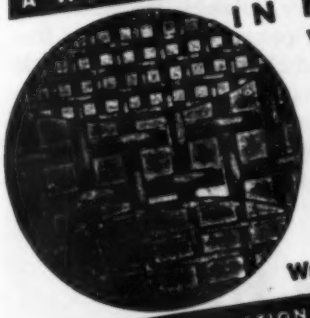
BESSER MANUFACTURING CO.

ALPENA, MICHIGAN, U. S. A.

Complete Equipment for Concrete Products Plants

A 7015-¼

Industry has A WORLD OF CONFIDENCE IN NAT-ALOY WIRE CLOTH



COVERS EVERY REQUIREMENT

. . . for a dependable, long-wearing, non-crystalizing Screen Cloth. Has "Nat-Aloy" Lock Crimp Meshes. Preferred for screening accuracy, economy and serviceability. All Sizes — All Meshes — All Gauges.

Write for Catalog No. 55

NATIONAL WIRE CLOTH CO., INC
St. Paul, Minn

CEMENT COLORS with these 3 important features:

- Reichard-Coulston synthetic and natural cement colors are limeproof.
- Reichard-Coulston cement colors are weatherproof.
- Reichard-Coulston pigments conform to all cement and concrete specifications for color.

Choose from a wide range of Reichard-Coulston natural and synthetic cement colors: reds, yellows, browns, green. For FREE color card, write today.

REICHARD-COULSTON, INC.
15 East 26th St., New York 10, N.Y.

OUR 100th YEAR: 1854-1954

FACTORY: Bethlehem, Pa.
OFFICES in Boston and Chicago
WAREHOUSES in Principal Cities in U.S.A. and Canada

FREE Color Card

Reichard-Coulston, Inc. CM 74
15 E. 26th St., N.Y.C. 10

Gentlemen: Please send me a free card of Reichard-Coulston cement colors:

Company_____

Attention_____

Street_____

City_____ Zone____ State_____

HIGH OUTPUT • QUALITY • PROFITS

in making Septic Tanks are yours with CARPENTER Equipment

Looking for a sure way to increase your concrete business? Just install CARPENTER Units to get big, economical production of septic tanks meeting all specifications. One man handles our delivery rig. Satisfied customers from coast to coast.

Write for Details

CARPENTER MFG. CO.
Phone 28938
Harvie Road, Carrier No. 94
Box 470, Richmond, Virginia

with COLUMBIA'S 12" HIGH

COMBINATION TILE-AND-BLOCK MACHINE

You can make

THE MOST VERSATILE BLOCK MACHINE *ever built!*

Embodying the same rugged construction and automatic features of the Columbia Model 8 & Model 12, the combination tile-and-block machine gives the producer a wider range of concrete products than any other machine. It features high production...electronic controls...standard plain pallets...streamlined, compact design...and quick mold change!

12 INCH HIGH

Drain tile . . . Partition blocks . . . Flue liners . . . Silo staves . . . Water meter boxes...and other special shapes. This amazing machine will enable you to achieve high production of these 12"-high shapes to meet the tremendous and growing demand.

8 INCH HIGH

Standard and special concrete blocks in all shapes. More than 240 molds are available for Columbia machines. The Columbia combination machine features rapid changeover from one style and height to another. With one Columbia machine you can produce the whole range...from standard block to all special shapes!

4 INCH HIGH

The Columbia combination machine produces all the normal blocks in the popular 4-inch height, now finding a ready market throughout the concrete industry. For beauty...for customer acceptance...for the "ranch-style" look... 4-inch high blocks top the market!

Write today for catalog describing Columbia's one, two or three-block machines, combination tile-and-block machines, block splitters, etc.

District Offices: **Wisconsin, Ohio, South Carolina, Mississippi, Florida, New Jersey, Virginia, California and Massachusetts.**

Columbia MACHINE

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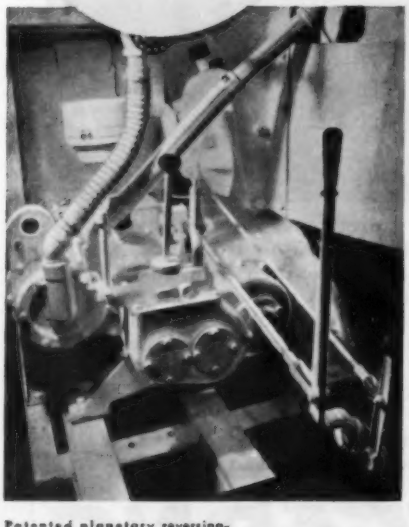
Mounts on lower-cost, more-maneuverable truck chassis

Hauls more payload — less non-productive dead-weight

Costs less to operate and maintain

LE ROI-TRANSO MIXERS



Patented planetary reversing-type transmission provides two agitating and discharge speeds — with a low mixing speed for long hauls that saves engine wear and tear. TD-13

WHEN you can save as much as 1,000 pounds of dead-weight — haul bigger legal payloads — pay less for your truck chassis — make more round trips daily — and cut costs all around — mister, you've got yourself a real mixer. And that's just what you get, when you get a Le Roi-Transo Mixer!

Its patented direct drive is one reason why a Le Roi-Transo Mixer delivers top money-making performance. It eliminates heavy chains, ring gears, sprockets, and bevel gears — and the weight and maintenance troubles that go with them.

And it includes a 2-speed, planetary, reversing-type transmission that gives you shock-free starting and fast discharge-reversing under full load — *without clutching.*

But that's not all. A Le Roi-Transo also gives you unequalled mixing action . . . 40% faster loading . . . smooth, speedy discharging — even of slump concrete . . . and many other features.

Yes, sir, feature for feature, a Le Roi-Transo is your best mixer buy. Ask your Le Roi-Transo distributor to show you. Or, write for bulletin.

LE ROI COMPANY

A Subsidiary of Westinghouse Air Brake Co.

TRANSO DIVISION

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STEARNS 15 DOUBLES PRODUCTION

of PROSPEROUS PERLA BLOCK CORP.

MOORESTOWN, NEW JERSEY

The completely automatic, one-man, 3-at-a-time Stearns 15, working smoothly, efficiently, profitably in the Moorestown, N. J. plant. Utilizing the Stearns Dual-Shaft, Unidirectional, Vibrating Unit, the Stearns Pneumatic, Magnetic Offbearer and the Stearns Power Pallet Return, this machine, in one short year, has doubled the concern's production while cutting labor costs to a minimum. Stanley Measley is the operator.

PERLA BLOCK CORPORATION

CINDER BLOCK MANUFACTURERS • BUILDING MATERIALS

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Stearns Manufacturing Company, Inc
Adrian, Michigan

April 15, 1954

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The Stearns 15, which we installed about a year ago, already has proved to be the greatest money-maker and labor-saver this company has ever seen.

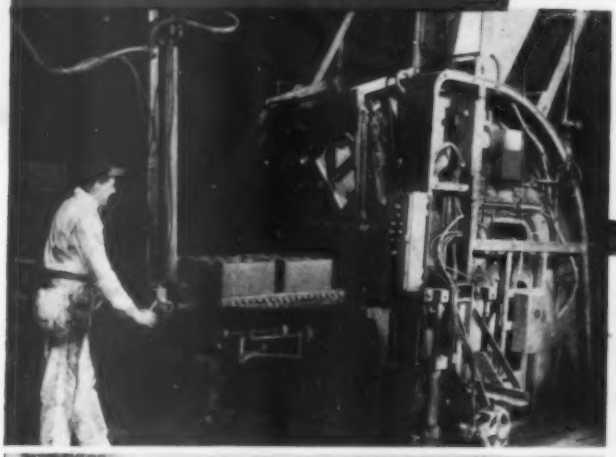
Before purchasing our new machine, we had two Stearns No. 9 Joltcretes, and being very much pleased with their durability and fine production records, we naturally voted 100 percent Stearns again, when the time came to modernize for more profit.

The new "15", equipped with pneumatic offbearer and automatic pallet return, has proved to us that Stearns is way ahead in the field of engineering. With these new features, our labor has been cut down to a minimum, our production has doubled and the quality of the block just can't be beat.

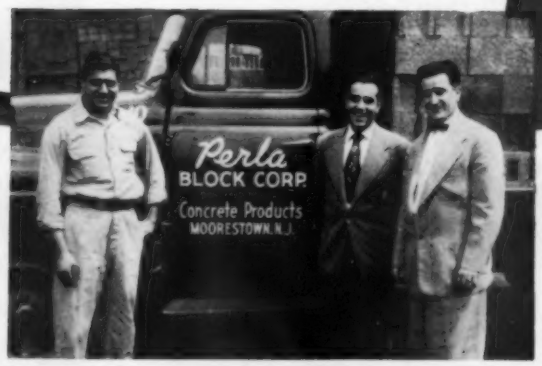
We have found our association with Stearns to be a most pleasant and profitable one, and we highly recommend Stearns machinery and parts service to anyone who wants to be a leader in the concrete block business.

NDB/mp

Very truly yours,
Nicholas Di Blasio
Nicholas Di Blasio
Production Manager



View of yard and buildings of Perla Block Corp., showing enormous output of Stearns 15 cinder block for this Delaware River Valley area.



Happy?—You can bet your life these executives of Perla Block Corporation are happy, with a prosperous concern like their own, and Stearns right behind them—all the way! Left to right, Production Manager Nicholas Di Blasio, who wrote the accompanying letter; Joseph Di Blasio, office manager, and Daniel Perla, sales manager. Assistant Production Manager is Harry Smith. The company is a real family enterprise. Six Perla brothers and their two nephews, the Di Blasios, started the concern in 1947.

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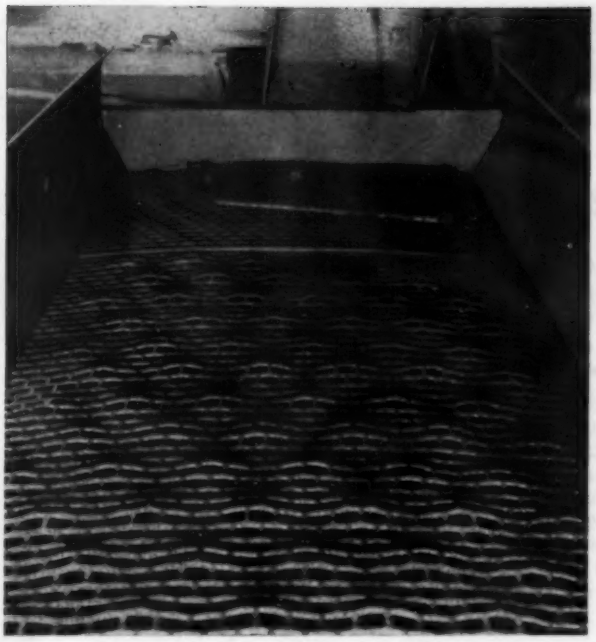

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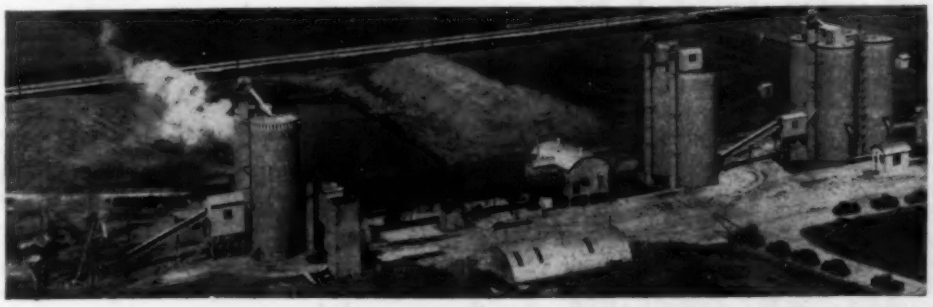

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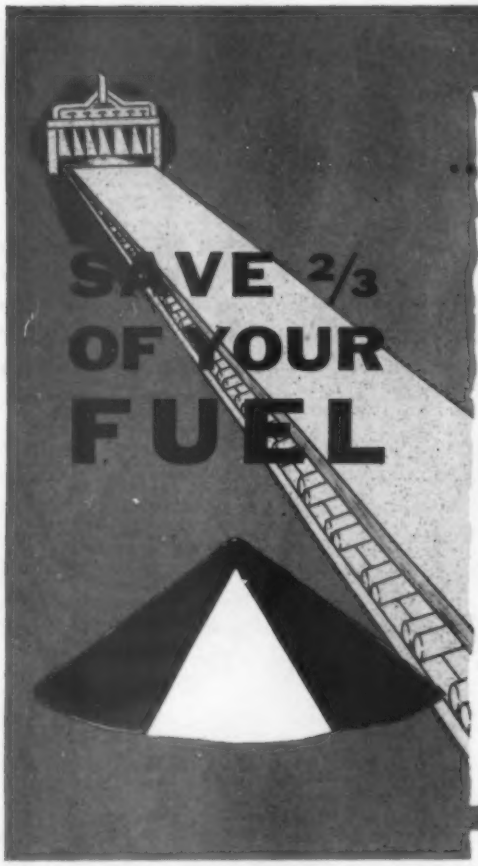

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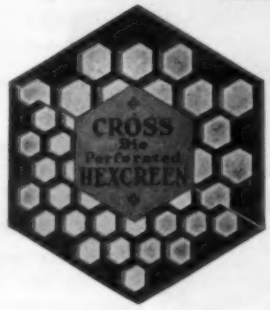

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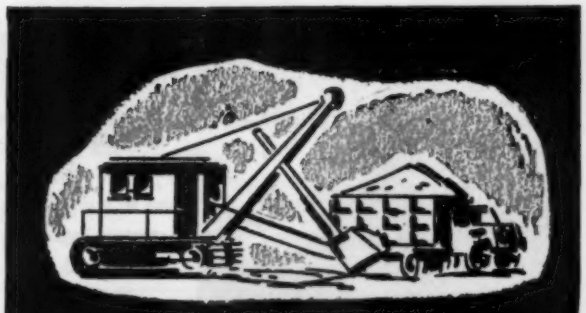

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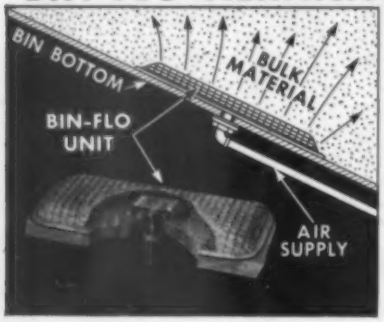

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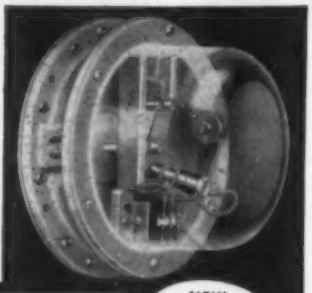

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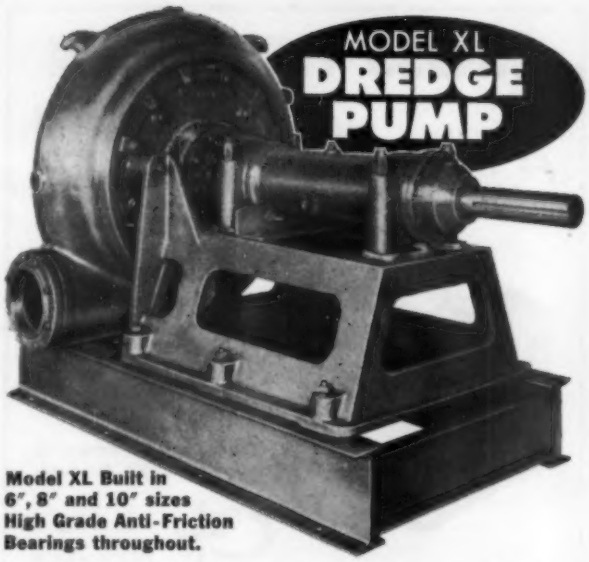

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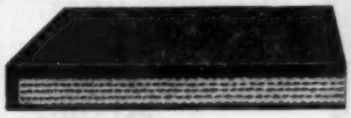

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